

PodSecurityPolicy Scale Testing

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Conclusions

1. PodSecurityPolicy has no measurable impact on pod startup latency
2. PSP does have a measurable impact on request latency at high (>100) numbers of policies & bindings
 - a. This may also be impacted by the number of associated role bindings
 - b. The impact on pod create requests is still impacted by unbound policies

Test Setup

```
git co release-1.8
git fetch upstream
git reset --hard upstream/release-1.8
make clean && make quick-release

export KUBE_GCE_INSTANCE_PREFIX=$USER-psp-scale
export CLUSTER_NAME=$USER-psp-scale-testing
export PROJECT=$PROJECT
export KUBE_GCE_ZONE=$ZONE
export NUM_NODES=1000 # or 10
export HEAPSTER_MACHINE_TYPE=n1-standard-8 # only for 1000 node test
export ENABLE_POD_SECURITY_POLICY=true # or disabled

gcloud config set project ${PROJECT}
```

Setup unuseable policies:

```
./make_policies $TOTAL $AVAILABLE $USEABLE
```

Fake policies are named with a scheme that forces the PSP controller to search all unuseable policies prior to finding the useable policy (due to the alphabetical sorting):

- aaa.scale.a.unavailable.{index}
- aaa.scale.b.unuseable.{index}

Run tests with:

```
kubetest -v -test --test_args="--ginkgo.focus=\[Feature:Performance\]
--ginkgo.skip=Load\\scapacity"
```

Test Cases

	10 Nodes	1000 Nodes
PSP disabled		PASS Perc100: 3386.182578 Perc50: 1639.148099 Perc90: 2231.24665 Perc99: 2532.260327
5+1 total 1 available 1 useable	PASS Perc100: 2401.789034 Perc50: 1508.038993 Perc90: 2239.663645 Perc99: 2401.789034	PASS Perc100: 2969.339977 Perc50: 1650.138542 Perc90: 2254.408489 Perc99: 2552.064896
5+10 total 10 available 1 useable	PASS Perc100: 2677.554307 Perc50: 1606.147187 Perc90: 2428.270788 Perc99: 2677.554307	PASS Perc100: 2767.745481 Perc50: 1645.759202 Perc90: 2234.752756 Perc99: 2523.399519
5+100 total 10 available 1 useable	PASS Perc100: 2393.034361 Perc50: 1617.276919 Perc90: 1867.83022 Perc99: 2393.034361	PASS Perc100: 2641.648608 Perc50: 1655.799167 Perc90: 2188.378906 Perc99: 2532.449009
5+100 total 100 available 1 useable	PASS Perc100: 2305.433818 Perc50: 1593.512606 Perc90: 2162.286277 Perc99: 2305.433818	PASS Perc100: 2670.743404 Perc50: 1662.89862 Perc90: 2222.780257 Perc99: 2525.339749
5+1000 total 1000 available 1 useable		FAIL: 3 high-latency requests (see below) Perc100: 2733.170039 Perc50: 1648.68571 Perc90: 2225.636287 Perc99: 2538.906204
5+5000 total 1 available 1 useable		FAIL: 1 high-latency request Perc100: 2875.844641 Perc50: 1681.387468 Perc90: 2246.876366 Perc99: 2538.868877

Useable policy = privileged (e2e-test-privileged-psp)
Unuseable policies = allow none, bound to all authenticated
Unavailable policies = allow none, unbound

Request Latency Results

1000 nodes 1000 total 1000 available:				
		Perc50	Perc90	Perc99
LIST	nodes	66.485ms	5.5719s	7.96151s
LIST	Pods	15.953ms	83.983ms	8.877255s
PATCH	nodes	2.429ms	2.18855s	4.016141s
POST	Pods	8.637055s	13.330724s	15.415629s
PUT	nodes	180.261ms	658.595ms	895.462ms
1000 nodes 1000 total 1 available:				
LIST	limitranges	1.1ms	3.299ms	382.163ms
LIST	nodes	81.656ms	94.441ms	312.713ms
LIST	Pods	17.918ms	40.576ms	266.991ms
LIST	Pods	36.397ms	68.367ms	68.367ms
POST	Pods	8.696784s	20.497659s	22.472421s
1000 nodes 100 total 100 available:				
DELETE	rc	2.167ms	3.547ms	46.922ms
LIST	nodes	63.626ms	68.368ms	153.578ms
LIST	Pods	16.731ms	23.088ms	221.439ms
LIST	Pods	37.105ms	61.058ms	70.419ms
POST	Pods	9.07ms	10.362ms	24.237ms
1000 nodes 100 total 10 available:				
LIST	nodes	63.994ms	68.926ms	179.983ms
LIST	Pods	16.459ms	20.415ms	221.825ms
LIST	Pods	34.941ms	71.584ms	75.343ms
POST	Pods	8.978ms	10.289ms	17.307ms
PUT	apiservices	798µs	1.007ms	17.989ms
1000 nodes 10 total 10 available:				
LIST	nodes	64.103ms	72.024ms	163.737ms
LIST	Pods	16.162ms	20.119ms	218.014ms
LIST	Pods	33.844ms	61.956ms	65.277ms
PATCH	configmaps	1.51ms	2.065ms	12.181ms
PUT	apiservices	799µs	992µs	22.448ms
1000 nodes 1 total 1 available:				
DELETE	rc	2.239ms	3.741ms	198.476ms
LIST	configmaps	1.299ms	2.266ms	14.769ms
LIST	nodes	63.987ms	76.002ms	169.453ms
LIST	Pods	15.08ms	18.109ms	224.845ms
LIST	Pods	34.386ms	61.061ms	62.422ms
1000 nodes PSP disabled:				
DELETE	Pods	3.857ms	5.941ms	9.169ms
LIST	nodes	65.679ms	73.984ms	184.227ms
LIST	Pods	16.93ms	21.776ms	208.09ms
LIST	Pods	39.834ms	66.498ms	69.901ms
PATCH	rc	2.58ms	3.059ms	10.688ms

10 nodes 100 total 100 available:				
DELETE	rc	6.681ms	46.781ms	48.812ms
GET	secrets	267µs	3.064ms	29.606ms
PATCH	nodes	2.795ms	5.575ms	39.114ms
POST	Pods	18.349ms	55.376ms	175.553ms
POST	Pods	1.975ms	12.46ms	75.265ms
10 nodes 100 total 10 available:				
DELETE	Pods	5.989ms	10.618ms	73.159ms
GET	secrets	563µs	3.374ms	35.981ms
POST	Pods	2.13ms	9.684ms	24.406ms
POST	Pods	21.43ms	68.576ms	216.546ms
PUT	Pods	2.122ms	5.32ms	25.985ms
10 nodes 10 total 10 available:				
DELETE	Pods	6.052ms	11.033ms	32.347ms
DELETE	rc	9.922ms	35.753ms	38.225ms
PATCH	nodes	2.901ms	7.057ms	23.227ms
POST	Pods	2.338ms	11.519ms	29.169ms
POST	Pods	5.058ms	15.149ms	60.258ms
10 nodes 1 total 1 available:				
DELETE	Pods	6.131ms	10.889ms	22.736ms
GET	secrets	515µs	4.398ms	36.235ms
PATCH	nodes	2.771ms	5.761ms	30.64ms
POST	Pods	3.195ms	12.436ms	46.616ms
POST	Pods	4.964ms	15.216ms	63.121ms