

02 | 基礎篇

到底應該怎麼理解“平均負載”？





開門見山

System load averages \neq CPU usage%



Load average 數據從何得知

```
[service@prod-server ~]$ uptime
```

```
13:42:48 up 77 days, 8:48, 9 users, load average: 1.70, 1.63, 1.61
```

```
Load average: 1.62 1.61 1.60
```

```
Uptime: 77 days, 08:48:21
```



Load average 數據從何算來

Man 說詞：

System load averages is the **average number of processes that are either in a runnable or uninterruptable state**.

A process in a **runnable** state is either using the CPU or waiting to use the CPU.

A process in **uninterruptable** state is waiting for some I/O access, eg waiting for disk.

The averages are taken over the three time intervals.

Load averages are not normalized for the number of CPUs in a system, so a load average of 1 means a single CPU system is loaded all the time while on a 4 CPU system it means it was idle 75% of the time.

Load average = process(**runnable+uninterruptable**) 數量 / 時間區間(1 \ 5 \ 15 分鐘)



Load average 數據意思是

1 件事情不代表很閒

一定要知道
幫你工作的人有多少位(Core)

20 件事情不代表很忙



Load average 業務場景考量點都不同

- 4核心的伺服器:想想看 load average: 10.0, 10.0, 10.0
- 32核心的伺服器:想想看 load average: 20.0, 20.0, 20.0
- 非電商的 web server:想想看 load average < Number of CPU cores 網頁還是覺得慢
- 承擔重責的 SQL 伺服器:想想看 load average: 5.0, 5.0, 5.0



用數據分析 Load average

uptime(htop) 比起第一個數據, 更要注意第二、三數據

load average: 2.0, **10.0**, **15.0**



用 pidstat 分析 Load average

```
devops@afu-ubuntu-18:~$ pidstat -u 5 1
```

```
Linux 5.0.0-1033-gcp (afu-ubuntu-18)
```

```
04/22/20
```

```
_x86_64_
```

```
(4 CPU)
```

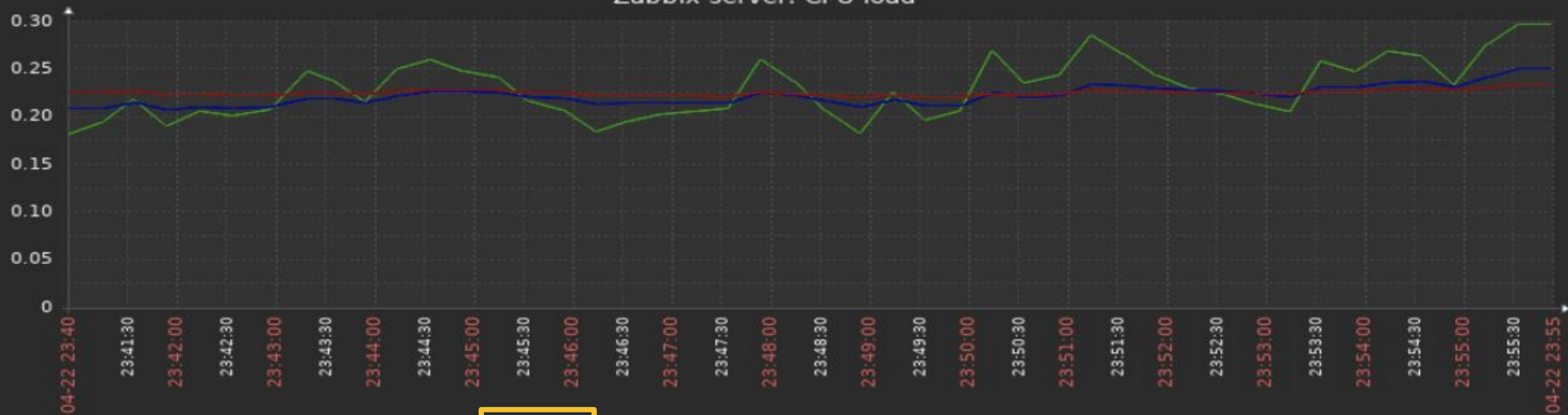
15:01:18	UID	PID	%usr	%system	%guest	%wait	%CPU	CPU	Command
15:01:23	0	10	0.00	0.20	0.00	0.00	0.20	2	rcu_sched
15:01:23	112	10747	0.00	0.20	0.00	0.00	0.20	0	mysqld
15:01:23	1022	15634	100.00	0.00	0.00	0.00	100.00	1	stress
15:01:23	0	21408	0.00	0.20	0.00	0.00	0.20	3	containerd
15:01:23	0	23947	0.40	0.00	0.00	0.00	0.40	2	java

Average:	UID	PID	%usr	%system	%guest	%wait	%CPU	CPU	Command
Average:	0	10	0.00	0.20	0.00	0.00	0.20	-	rcu_sched
Average:	112	10747	0.00	0.20	0.00	0.00	0.20	-	mysqld
Average:	1022	15634	100.00	0.00	0.00	0.00	100.00	-	stress
Average:	0	21408	0.00	0.20	0.00	0.00	0.20	-	containerd
Average:	0	23947	0.40	0.00	0.00	0.00	0.40	-	java



關於 Zabbix Monitor

Zabbix server: CPU load



	last	min	avg	max
Processor load (1 min average per core)	0.2975	0.1812	0.2286	0.2975
Processor load (1 min average per core)	0.2975	0.1812	0.2286	0.2975
Processor load (1 min average per core)	0.2975	0.1812	0.2286	0.2975
Processor load (5 min average per core)	0.25	0.2075	0.2214	0.25
Processor load (5 min average per core)	0.25	0.2075	0.2214	0.25
Processor load (5 min average per core)	0.25	0.2075	0.2214	0.25
Processor load (15 min average per core)	0.2338	0.22	0.2247	0.2338
Processor load (15 min average per core)	0.2338	0.22	0.2247	0.2338
Processor load (15 min average per core)	0.2338	0.22	0.2247	0.2338

load average: 2.31, 2.01, 1.87



關於 Zabbix Monitor

有什麼不一樣？

```
load average: 2.31, 2.01, 1.87
```