1. What is differnect http status code and explain meaning of each of them ?

1xx - Informational Responses

- 100 Continue – The server received the request headers and the client can continue sending the body.
- 101 Switching Protocols – The server switches protocols as requested by the client (HTTP to WebSockets).
- 102 Processing – The request is being processed but not yet completed.

2xx - Success Responses

- 200 OK – The request was successful, and the response contains the requested resource.
- 201 Created – The request resulted in a new resource being created.
- 202 Accepted – The request was accepted but is still being processed.
- 204 No Content – The request was successful, but there is no content in the response.

3xx - Redirection Responses

- 301 Moved Permanently – The requested resource has been permanently moved to a new URL.
- 302 Found – The resource is temporarily located at a different URL.
- 304 Not Modified – The resource has not changed since the last request (used for caching).
- 307 Temporary Redirect – The resource is temporarily available at a different URL, but the same request method should be used.
- 308 Permanent Redirect – Similar to 301 but retains the original request method.

4xx - Client Errors

- 400 Bad Request – The request was malformed or contained invalid syntax.
- 401 Unauthorized – Authentication is required to access the resource.
- 403 Forbidden – The client is not allowed to access the resource.
- 404 Not Found – The requested resource does not exist on the server.
- 405 Method Not Allowed – The HTTP method used is not supported for this resource.
- 408 Request Timeout – The server timed out waiting for the client’s request.
- 429 Too Many Requests – The client has sent too many requests in a short period (rate limiting).

5xx - Server Errors

- 500 Internal Server Error – A generic error indicating something went wrong on the server.
- 502 Bad Gateway – The server received an invalid response from an upstream server.
- 503 Service Unavailable – The server is temporarily unavailable due to overload or maintenance.
- 504 Gateway Timeout – The server did not receive a timely response from an upstream server.

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2. What database is used by Prometheus?

- Prometheus uses Prometheus TSDB (Time Series Database) as its built-in storage engine. This database is optimized for storing and querying time-series data efficiently.

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3. What is the differnece between different metrics types (counter , gauge , histogram)

Counter

A Counter is a metric that only increases (or resets to zero). It is typically used to track things like the number of requests, errors, or completed tasks.

- Use Cases:
  - Number of HTTP requests received (http_requests_total)
  - Number of failed jobs (job_failures_total)
  - Total bytes sent over a network

Gauge

A Gauge is a metric that can go up and down over time. It is used to measure values that can fluctuate, such as CPU usage, memory consumption, or the number of active users.

- Use Cases:
  - Current memory usage (memory_usage_bytes)
  - CPU utilization percentage (cpu_usage)
  - Temperature monitoring

Histogram

A Histogram measures the distribution of values by breaking them into buckets. It is useful for measuring request durations, latencies, or object sizes.

- Use Cases:
  - Request duration (http_request_duration_seconds)
  - Response sizes (response_size_bytes)

- Database query times

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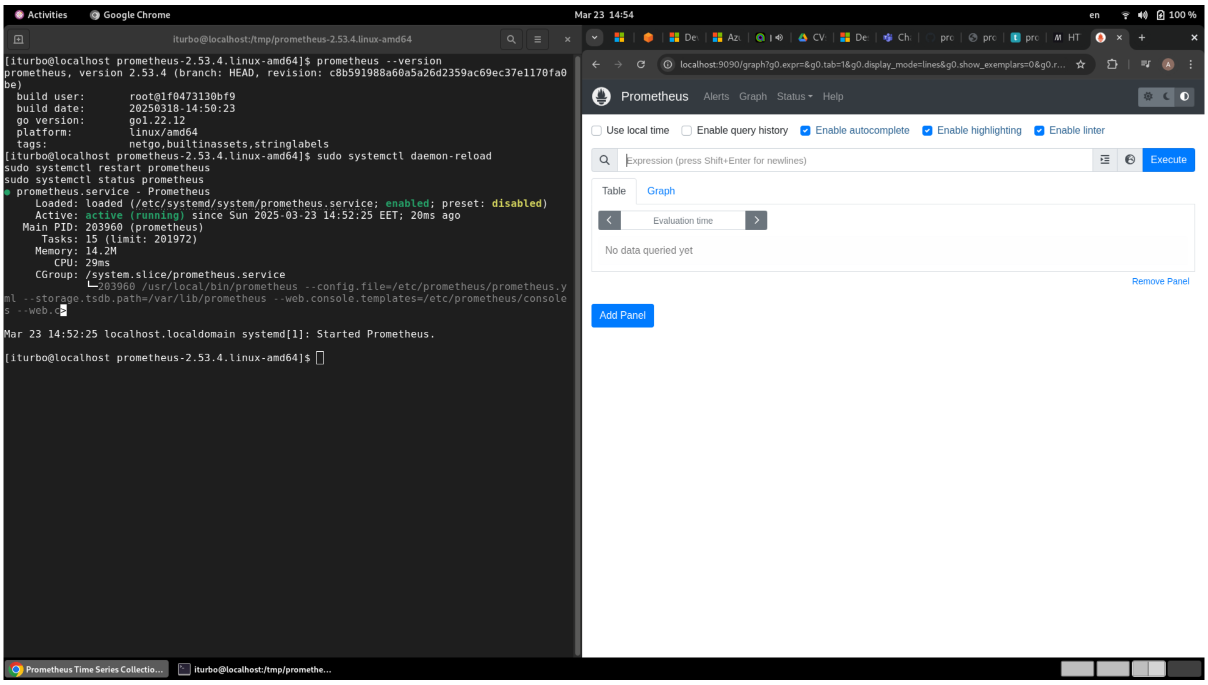
4. Install prometheus on your localhost or on server in any cloud provider

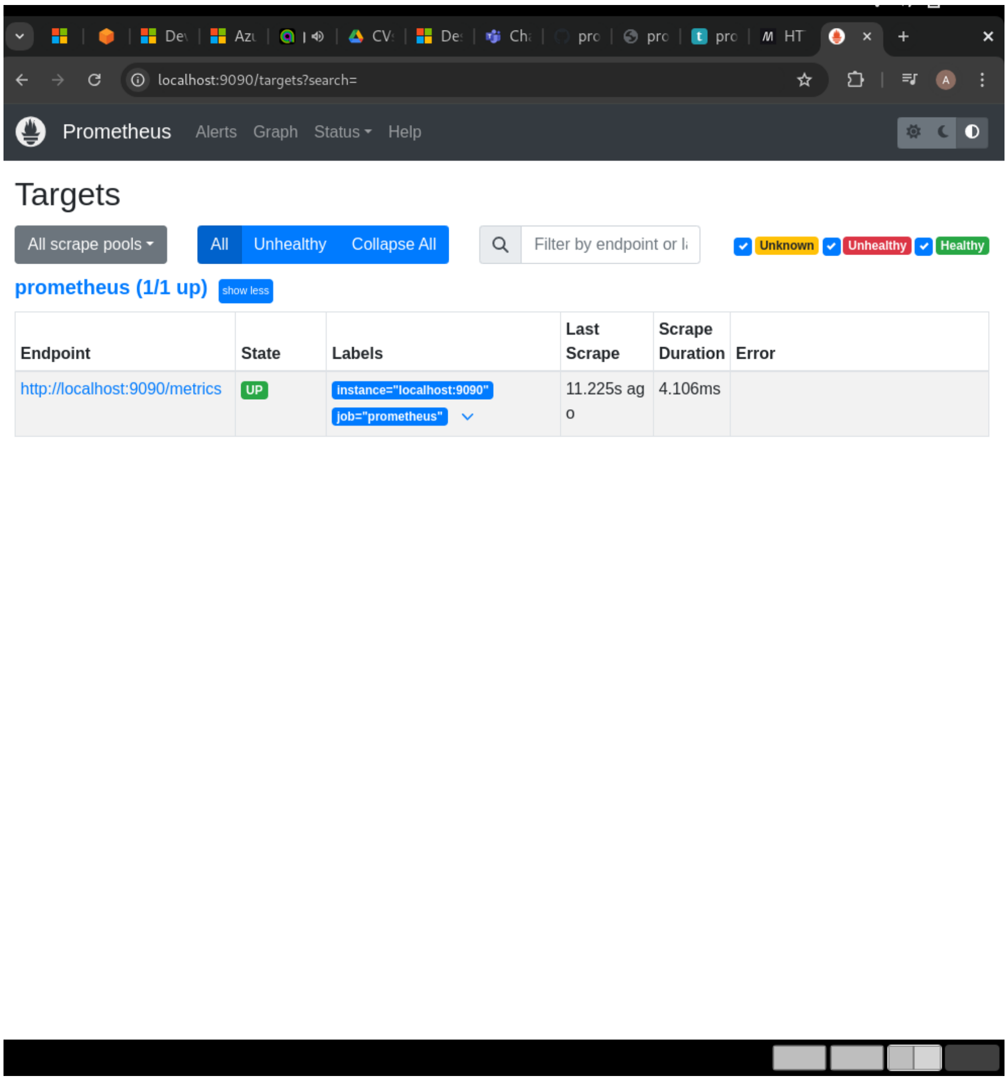


```
[iturbo@localhost prometheus-2.53.4.linux-amd64]$ prometheus --version
prometheus, version 2.53.4 (branch: HEAD, revision: c8b591988a60a5a26d2359ac69ec37e1170fa0
be)
  build user:       root@1f0473130bf9
  build date:       20250318-14:50:23
  go version:       go1.22.12
  platform:         linux/amd64
  tags:             netgo,builtinassets,stringlabels
[iturbo@localhost prometheus-2.53.4.linux-amd64]$ sudo systemctl daemon-reload
sudo systemctl restart prometheus
sudo systemctl status prometheus
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: disabled)
     Active: active (running) since Sun 2025-03-23 14:52:25 EET; 20ms ago
   Main PID: 203960 (prometheus)
      Tasks: 15 (limit: 201972)
     Memory: 14.2M
        CPU: 29ms
     CGroup: /system.slice/prometheus.service
             └─203960 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.y
ml --storage.tsdb.path=/var/lib/prometheus --web.console.templates=/etc/prometheus/console
s --web.c>

Mar 23 14:52:25 localhost.localdomain systemd[1]: Started Prometheus.

[iturbo@localhost prometheus-2.53.4.linux-amd64]$
```

Activities
Google Chrome
Mar 23 14:54
iturbo@localhost:/tmp/prometheus-2.53.4.linux-amd64
localhost:9090/graph?g0.expr=&g0.tab=1&g0.display_mode=lines&g0.show_exemplars=0&g0.r...
Prometheus
Alerts
Graph
Status
Help
Use local time
Enable query history
Enable autocomplete
Enable highlighting
Enable linter
Expression (press Shift+Enter for newlines)
Execute
Table
Graph
Evaluation time
No data queried yet
Remove Panel
Add Panel
Prometheus Time Series Collectio...
iturbo@localhost:/tmp/promethe...

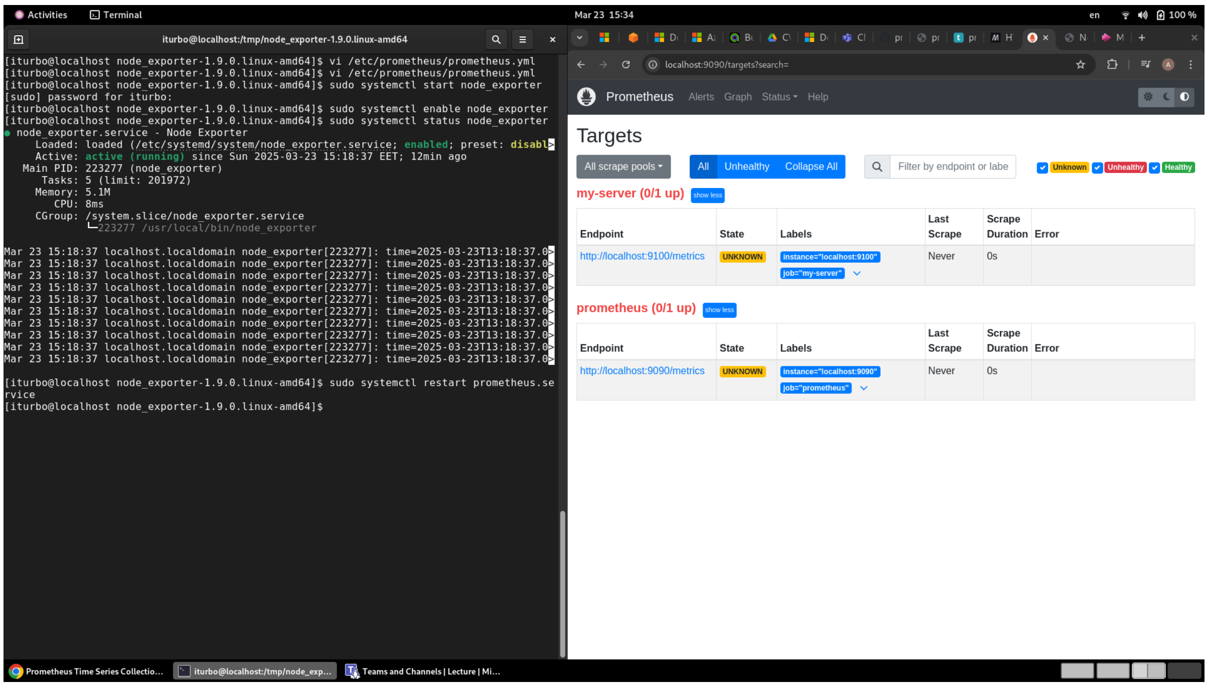


Targets

prometheus (1/1 up)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	UP	instance="localhost:9090" job="prometheus"	11.225s ago	4.106ms	

5. Add any new target to prometheus.yaml file to monitor different server and run any query on it using promql langauge



```
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ sudo systemctl start node_exporter
[sudo] password for iturbo:
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ sudo systemctl enable node_exporter
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ sudo systemctl status node_exporter
● node_exporter.service - Node Exporter
     Loaded: loaded (/etc/systemd/system/node_exporter.service; enabled; preset: disabl>
     Active: active (running) since Sun 2025-03-23 15:18:37 EET; 12min ago
   Main PID: 223277 (node_exporter)
      Tasks: 5 (limit: 201972)
     Memory: 5.1M
        CPU: 8ms
     CGroup: /system.slice/node_exporter.service
             └─223277 /usr/local/bin/node_exporter

Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>

[iturbo@localhost node_exporter-1.9.0.linux-amd64]$ sudo systemctl restart prometheus.se
rvice
[iturbo@localhost node_exporter-1.9.0.linux-amd64]$
```

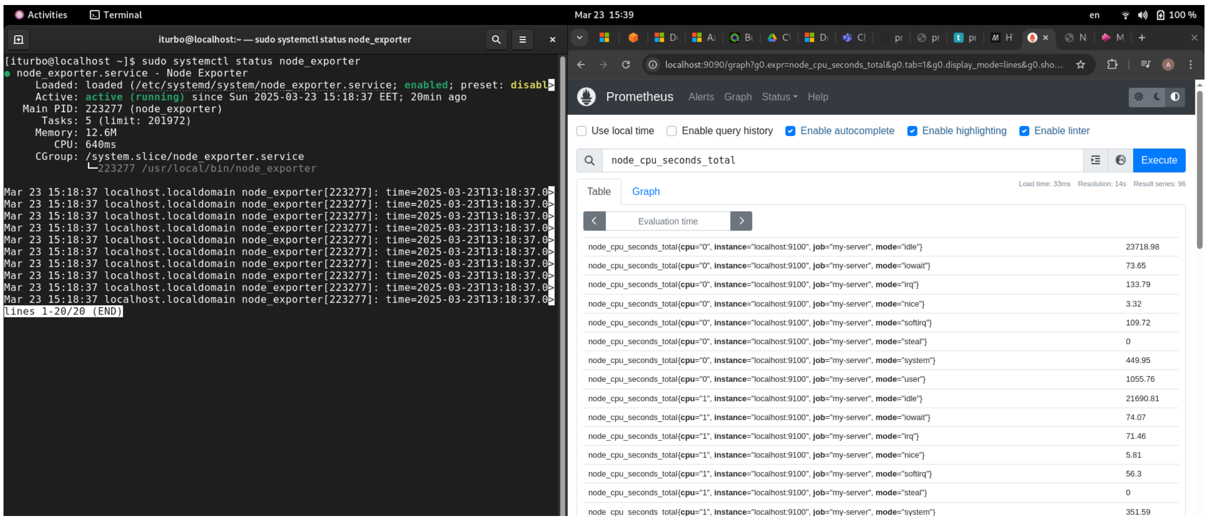
Targets

my-server (0/1 up)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9100/metrics	UNKNOWN	instance="localhost:9100" job="my-server"	Never	0s	

prometheus (0/1 up)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	UNKNOWN	instance="localhost:9090" job="prometheus"	Never	0s	



```
[iturbo@localhost ~]$ sudo systemctl status node_exporter
● node_exporter.service - Node Exporter
     Loaded: loaded (/etc/systemd/system/node_exporter.service; enabled; preset: disabl>
     Active: active (running) since Sun 2025-03-23 15:18:37 EET; 20min ago
   Main PID: 223277 (node_exporter)
      Tasks: 5 (limit: 201972)
     Memory: 12.6M
        CPU: 640ms
     CGroup: /system.slice/node_exporter.service
             └─223277 /usr/local/bin/node_exporter

Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
Mar 23 15:18:37 localhost.localdomain node_exporter[223277]: time=2025-03-23T13:18:37.0>
lines 1-20/20 (END)
```

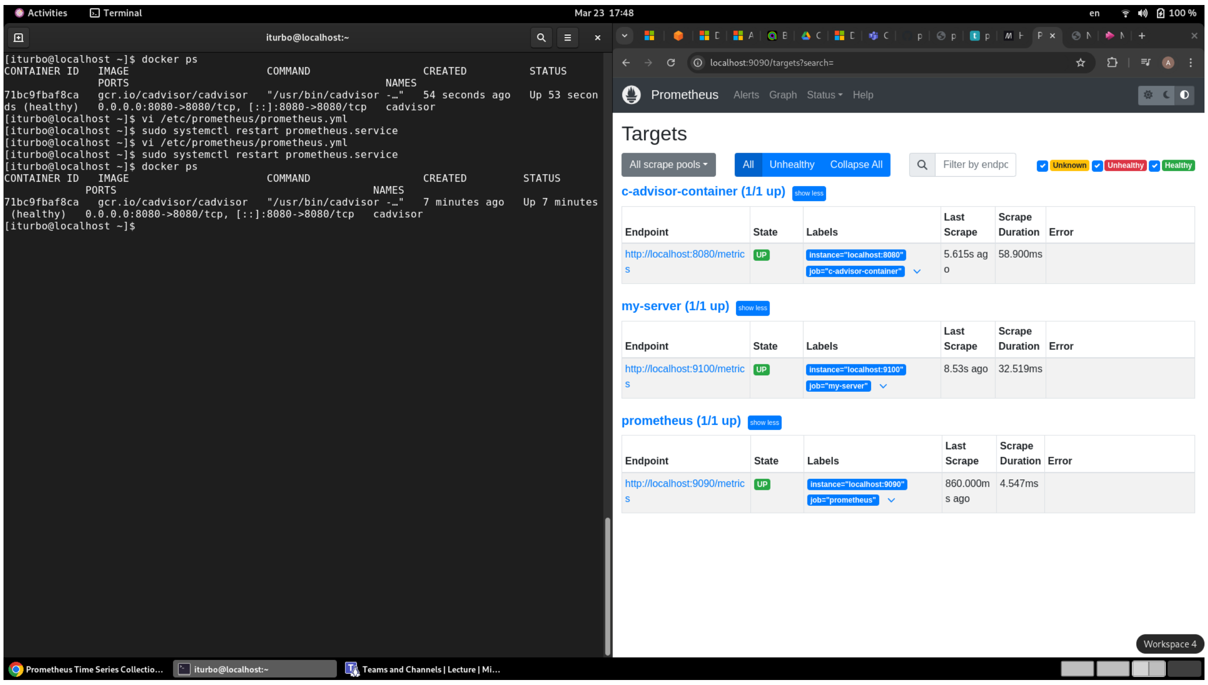
Use local time ☐ · Enable query history ☐ · Enable autocomplete ✓ · Enable highlighting ✓ · Enable linter ✓

```
node_cpu_seconds_total
```

Load time: 33ms Resolution: 14s Result series: 96

node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="idle"}	23718.98
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="iowait"}	73.65
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="irq"}	133.79
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="nice"}	3.32
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="softirq"}	109.72
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="steal"}	0
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="system"}	449.95
node_cpu_seconds_total{**cpu**="0", **instance**="localhost:9100", **job**="my-server", **mode**="user"}	1055.76
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="idle"}	21690.81
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="iowait"}	74.07
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="irq"}	71.46
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="nice"}	5.81
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="softirq"}	56.3
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="steal"}	0
node_cpu_seconds_total{**cpu**="1", **instance**="localhost:9100", **job**="my-server", **mode**="system"}	351.59

Monitor running containers on different server than prometheus one



```
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED          STATUS
               PORTS                                      NAMES
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   54 seconds ago   Up 53 secon
ds (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost ~]$ sudo systemctl restart prometheus.service
[iturbo@localhost ~]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost ~]$ sudo systemctl restart prometheus.service
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED         STATUS
             PORTS                                      NAMES
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   7 minutes ago   Up 7 minutes
 (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$
```

localhost:9090/targets?search=

Prometheus Alerts Graph Status Help

Targets

All scrape pools | All | Unhealthy | Collapse All | Filter by endpoint | ✓ Unknown ✓ Unhealthy ✓ Healthy

c-advisor-container (1/1 up) show less

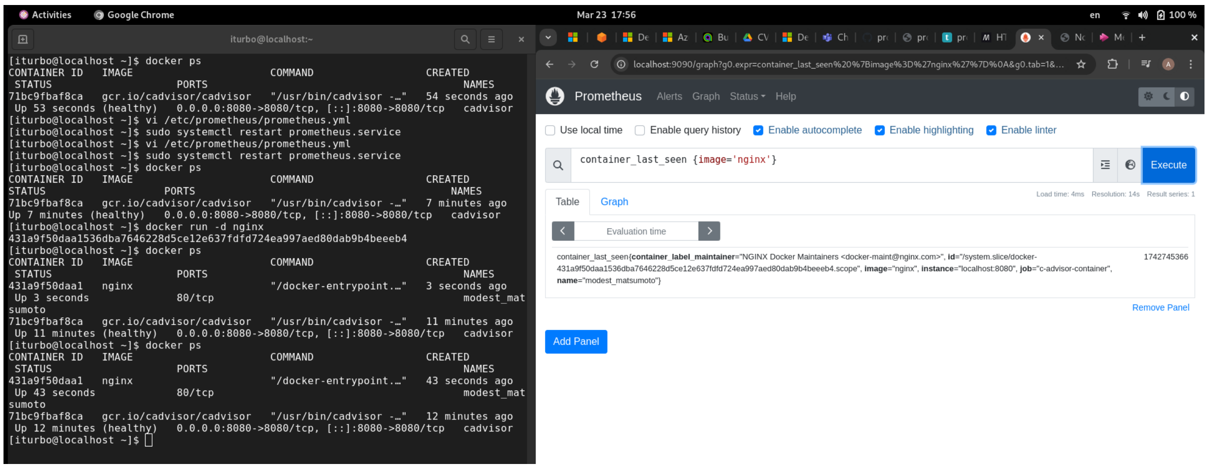
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:8080/metrics	UP	instance="localhost:8080" job="c-advisor-container"	5.615s ago	58.900ms	

my-server (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9100/metrics	UP	instance="localhost:9100" job="my-server"	8.53s ago	32.519ms	

prometheus (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	UP	instance="localhost:9090" job="prometheus"	860.000ms ago	4.547ms	



```
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED
 STATUS                    PORTS                                      NAMES
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   54 seconds ago
 Up 53 seconds (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost ~]$ sudo systemctl restart prometheus.service
[iturbo@localhost ~]$ vi /etc/prometheus/prometheus.yml
[iturbo@localhost ~]$ sudo systemctl restart prometheus.service
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED
STATUS                    PORTS                                      NAMES
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   7 minutes ago
Up 7 minutes (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$ docker run -d nginx
431a9f50daa1536dba7646228d5ce12e637fdfd724ea997aed80dab9b4beeeb4
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED
 STATUS                    PORTS                                      NAMES
431a9f50daa1   nginx                       "/docker-entrypoint.…"   3 seconds ago
 Up 3 seconds              80/tcp                                     modest_mat
sumoto
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   11 minutes ago
 Up 11 minutes (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$ docker ps
CONTAINER ID   IMAGE                       COMMAND                  CREATED
 STATUS                    PORTS                                      NAMES
431a9f50daa1   nginx                       "/docker-entrypoint.…"   43 seconds ago
 Up 43 seconds             80/tcp                                     modest_mat
sumoto
71bc9fbaf8ca   gcr.io/cadvisor/cadvisor   "/usr/bin/cadvisor -…"   12 minutes ago
 Up 12 minutes (healthy)   0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp   cadvisor
[iturbo@localhost ~]$
```

localhost:9090/graph?g0.expr=container_last_seen%20%7Bimage%3D%27nginx%27%7D%0A&g0.tab=1&…

Prometheus Alerts Graph Status Help

[ ] Use local time [ ] Enable query history [✓] Enable autocomplete [✓] Enable highlighting [✓] Enable linter

```
container_last_seen {image='nginx'}
```

Execute

Load time: 4ms Resolution: 14s Result series: 1

Table | Graph

Evaluation time

container_last_seen{**container_label_maintainer**="NGINX Docker Maintainers <docker-maint@nginx.com>", **id**="/system.slice/docker-431a9f50daa1536dba7646228d5ce12e637fdfd724ea997aed80dab9b4beeeb4.scope", **image**="nginx", **instance**="localhost:8080", **job**="c-advisor-container", **name**="modest_matsumoto"}	1742745366

Remove Panel

Add Panel