



TU856/3
INTRODUCTION TO DEVOPS

LAB 8 - GRAFANA AND PROMETHEUS



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1. WINDOWS EXPORTER METRICS

Terminal showing Windows exporter running with Listening on address=:9182.

```
C:\Users\35389\Desktop\Prometheus>docker run -d -p 9090:9090 --name=prometheus -v "C:\Users\35389\Desktop\Prometheus\prometheus.yml:/etc/prometheus/prometheus.yml" prom/prometheus:latest
time=2025-04-01T08:03:43.326Z level=WARN source=cs.go:108 msg="The cs collector holds a number of deprecated metrics and will be removed mid 2025. See https://github.com/prometheus-community/windows_exporter/pull/1596 for more information."
time=2025-04-01T08:03:43.326Z level=WARN source=cs.go:75 msg="The cs collector is deprecated and will be removed in a future release. Logical processors has been moved to cpu_info collector. Physical memory has been moved to memory collector. Hostname has been moved to os collector."
time=2025-04-01T08:03:44.053Z level=INFO source=main.go:397 msg="Running as LAPTOP-PAULINA\Paulina"
time=2025-04-01T08:03:44.054Z level=INFO source=main.go:224 msg="Enabled collectors: cpu, cs, memory, logical_disk, physical_disk, net, os, service, system"
time=2025-04-01T08:03:44.055Z level=INFO source=main.go:242 msg="Starting windows_exporter in 742.053ms version=0.36.5 branch=HEAD revision=a5e1ac71a1cc70b27146972eab38d3695178c goversion=go1.23.4 builddate=20250315-09:16:35 maxprocs=12"
time=2025-04-01T08:03:44.057Z level=INFO source=tls_config.go:347 msg="Listening on" address=[::]:9182
time=2025-04-01T08:03:44.057Z level=INFO source=tls_config.go:350 msg="TLS is disabled." http=false address=[::]:9182
```

Browser at <http://localhost:9182/metrics> displaying exporter metrics in plaintext.

```
HELP go_build_info Build information about the main Go module.
# HELP go_gc_duration_seconds A summary of the wall-time pause (stop-the-world) duration in garbage collection cycles.
# TYPE go_gc_duration_seconds summary
go_gc_duration_seconds{quantile="0"} 0.0005884
go_gc_duration_seconds{quantile="0.25"} 0.0005884
go_gc_duration_seconds{quantile="0.5"} 0.0005884
go_gc_duration_seconds{quantile="0.75"} 0.0005884
go_gc_duration_seconds{quantile="1"} 0.0005884
# TYPE go_gc_duration_seconds_count gauge
go_gc_duration_seconds_count 1
# HELP go_gc_gogc_percent Heap size target percentage configured by the user, otherwise 100. This value is set by the GODEBUG environment variable, and the runtime/debug.SetGCPercent function. Sourced from /gc/gogc/percent.
# TYPE go_gc_gogc_percent gauge
go_gc_gogc_percent 100
# HELP go_gc_gomemlimit_bytes Go runtime memory limit configured by the user, otherwise math.MaxInt64. This value is set by the GODEBUG environment variable, and the runtime/debug.SetMemoryLimit function. Sourced from /gc/gomemlimit/bytes.
# TYPE go_gc_gomemlimit_bytes gauge
go_gc_gomemlimit_bytes 2e+08
# HELP go_goroutines Number of goroutines that currently exist.
# TYPE go_goroutines gauge
go_goroutines 16
# HELP go_info Information about the Go environment.
# TYPE go_info gauge
go_info{version="go1.23.4"} 1
# HELP go_memstats_alloc_bytes Number of bytes allocated in heap and currently in use. Equals to /memory/classes/heap/objects/bytes.
# TYPE go_memstats_alloc_bytes gauge
go_memstats_alloc_bytes 840984
# HELP go_memstats_alloc_bytes_total Total number of bytes allocated in heap until now, even if released already. Equals to /gc/heap/allocs/bytes.
# TYPE go_memstats_alloc_bytes_total counter
go_memstats_alloc_bytes_total 1.0919e+06
# HELP go_memstats_buck_hash_sys_bytes Number of bytes used by the profiling bucket hash table. Equals to /memory/classes/profiling/buckets/bytes.
# TYPE go_memstats_buck_hash_sys_bytes gauge
go_memstats_buck_hash_sys_bytes 1.4080e+06
# HELP go_memstats_frees_total Total number of heap objects freed. Equals to /gc/heap/frees/objects + /gc/heap/tiny/allocs/objects.
# TYPE go_memstats_frees_total counter
go_memstats_frees_total 3247
# HELP go_memstats_gc_sys_bytes Number of bytes used for garbage collection system metadata. Equals to /memory/classes/metadata/other/bytes.
# TYPE go_memstats_gc_sys_bytes gauge
go_memstats_gc_sys_bytes 1.09932e+06
# HELP go_memstats_heap_alloc_bytes Number of heap bytes allocated and currently in use, same as go_memstat_alloc_bytes. Equals to /memory/classes/heap/objects/bytes.
# TYPE go_memstats_heap_alloc_bytes gauge
go_memstats_heap_alloc_bytes 840984
# HELP go_memstats_heap_idle_bytes Number of heap bytes waiting to be used. Equals to /memory/classes/heap/released/bytes + /memory/classes/heap/free/bytes.
# TYPE go_memstats_heap_idle_bytes gauge
go_memstats_heap_idle_bytes 1.64657e+06
# HELP go_memstats_heap_inuse_bytes Number of heap bytes that are in use. Equals to /memory/classes/heap/objects/bytes + /memory/classes/heap/used/bytes.
# TYPE go_memstats_heap_inuse_bytes gauge
go_memstats_heap_inuse_bytes 2.1782e+06
# HELP go_memstats_heap_objects Number of currently allocated objects. Equals to /gc/heap/objects/objects.
# TYPE go_memstats_heap_objects gauge
go_memstats_heap_objects 3389
# HELP go_memstats_heap_released_bytes Number of heap bytes released to OS. Equals to /memory/classes/heap/released/bytes.
# TYPE go_memstats_heap_released_bytes gauge
go_memstats_heap_released_bytes 3.74314e+06
# HELP go_memstats_heap_sys_bytes Number of heap bytes obtained from system. Equals to /memory/classes/heap/objects/bytes + /memory/classes/heap/used/bytes + /memory/classes/heap/released/bytes + /memory/classes/heap/free/bytes.
# TYPE go_memstats_heap_sys_bytes gauge
go_memstats_heap_sys_bytes 7.92086e+06
# HELP go_memstats_last_gc_time_seconds Number of seconds since 1970 of last garbage collection.
# TYPE go_memstats_last_gc_time_seconds gauge
go_memstats_last_gc_time_seconds 1.748491019e+09
# HELP go_memstats_malloc_total Total number of heap objects allocated, both live and gc-ed. Semantically a counter version for go_memstats_heap_objects_gauge. Equals to /gc/heap/allocs/objects + /gc/heap/tiny/allocs/objects.
# TYPE go_memstats_malloc_total counter
go_memstats_malloc_total 3407
# HELP go_memstats_mcache_inuse_bytes Number of bytes in use by mcache structures. Equals to /memory/classes/metadata/mcache/inuse/bytes.
# TYPE go_memstats_mcache_inuse_bytes gauge
go_memstats_mcache_inuse_bytes 34056
# HELP go_memstats_mcache_sys_bytes Number of bytes used for mcache structures obtained from system. Equals to /memory/classes/metadata/mcache/inuse/bytes + /memory/classes/metadata/mcache/free/bytes.
# TYPE go_memstats_mcache_sys_bytes gauge
go_memstats_mcache_sys_bytes 35032
```

2. PROMETHEUS IN DOCKER

Terminal showing docker run command pulling the Prometheus image.

```
C:\Users\35389\Desktop\Prometheus>docker run -d -p 9090:9090 --name=prometheus -v "C:\Users\35389\Desktop\Prometheus\prometheus.yml:/etc/prometheus/prometheus.yml" prom/prometheus:latest
Unable to find image 'prom/prometheus:latest' locally
latest: Pulling from prom/prometheus
9fa9226be034: Pull complete
1617e25568b2: Pull complete
b2d104eee733: Pull complete
448ad452204b: Pull complete
6547672edc7f: Pull complete
63d8c1417d94: Pull complete
ffe0cdcd9bba: Pull complete
9e81dc407c65: Pull complete
1cc8183b9830: Pull complete
3b84d8789434: Pull complete
8dd923415b9e: Pull complete
3baf9c98b42: Pull complete
Digest: sha256:502ad90314c7485892ce696cb14a99fceab9fc27af29f4b427f41bd39701a199
Status: Downloaded newer image for prom/prometheus:latest
6a7eedacee194c3c6d0ff36c8feb93819be0aabb594a59626526ea7b5cb2a6a8
```

Prometheus Targets page showing both prometheus and windows_exporter targets are UP.

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
prometheus (1/1 up)					
http://localhost:9090/metrics	UP	instance="localhost:9090" job="prometheus" Discovered labels: address="localhost:9090" metrics_path="/metrics" scheme="http" scrape_interval="15s" scrape_timeout="10s" job="prometheus"	3.858s ago	7.181ms	
windows_exporter (1/1 up)					
http://host.docker.internal:9182/metrics	UP	instance="host.docker.internal:9182" job="windows_exporter" Discovered labels: address="host.docker.internal:9182" metrics_path="/metrics" scheme="http" scrape_interval="15s" scrape_timeout="10s" job="windows_exporter"	517.000ms ago	65.649ms	

3. PROMETHEUS QUERY

A Prometheus query for network usage was executed.

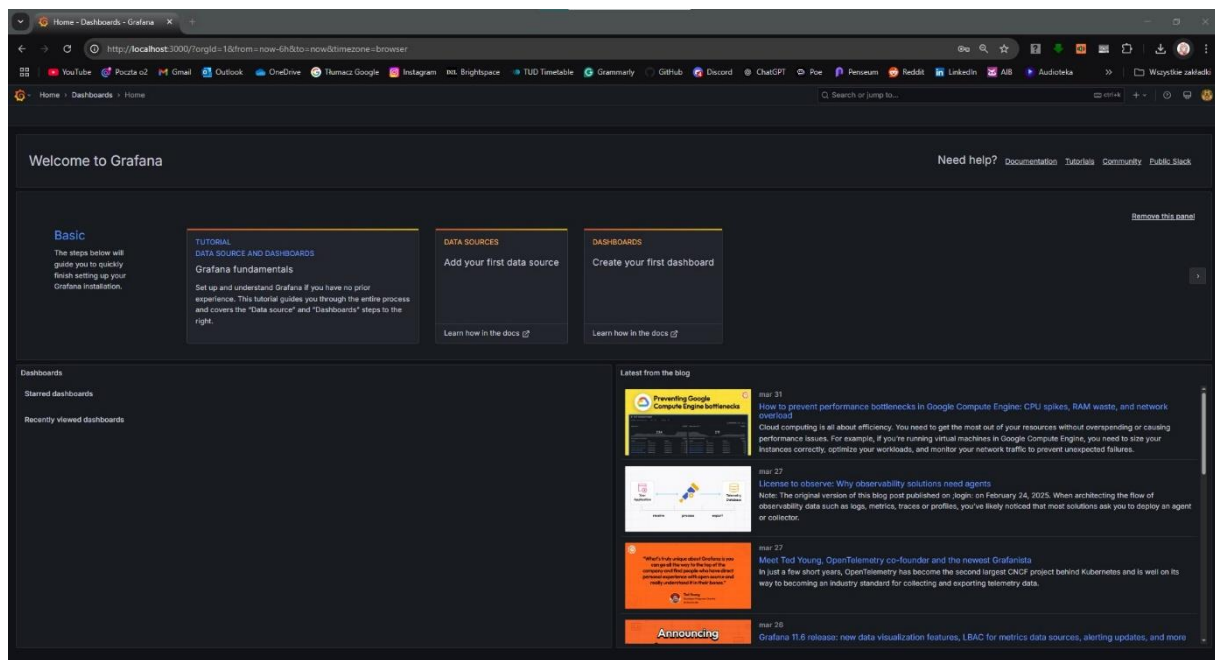
Instance	Value
host.docker.internal:9182 job="windows_exporter"	0
localhost:9090 job="prometheus"	1078.121822404487

4. GRAFANA RUNNING

Grafana is running in Docker and accessible via localhost:3000.

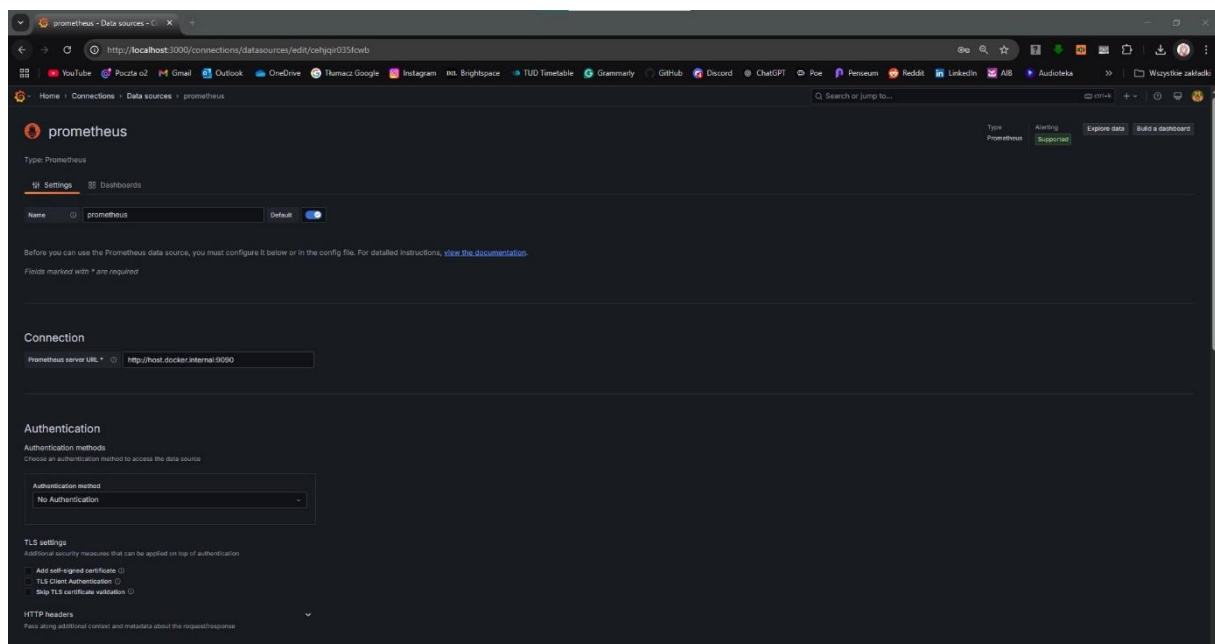
```
C:\Users\35389\Desktop\Prometheus>docker run -d -p 3000:3000 --name=grafana grafana/grafana-oss:latest
Unable to find image 'grafana/grafana-oss:latest' locally
latest: Pulling from grafana/grafana-oss
f18232174bc9: Pull complete
70ca445a67c2: Pull complete
bbb8b5218cfb: Pull complete
2a08a00fe446: Pull complete
5b32a5607528: Pull complete
c0a27b1e2168: Pull complete
ce185550173e: Pull complete
daf4bae1c5dd: Pull complete
b9d78c8c657a: Pull complete
babadc1b811e: Pull complete
Digest: sha256:62d2b9d20a19714ebfe48d1bb405086081bc602aa053e28cf6d73c7537640dfb
Status: Downloaded newer image for grafana/grafana-oss:latest
37efd88be0ae3c8bf0f148f6e47248dc3e033389c5557c2907d9002613761ed3
```

The UI loaded successfully, confirming it's working.

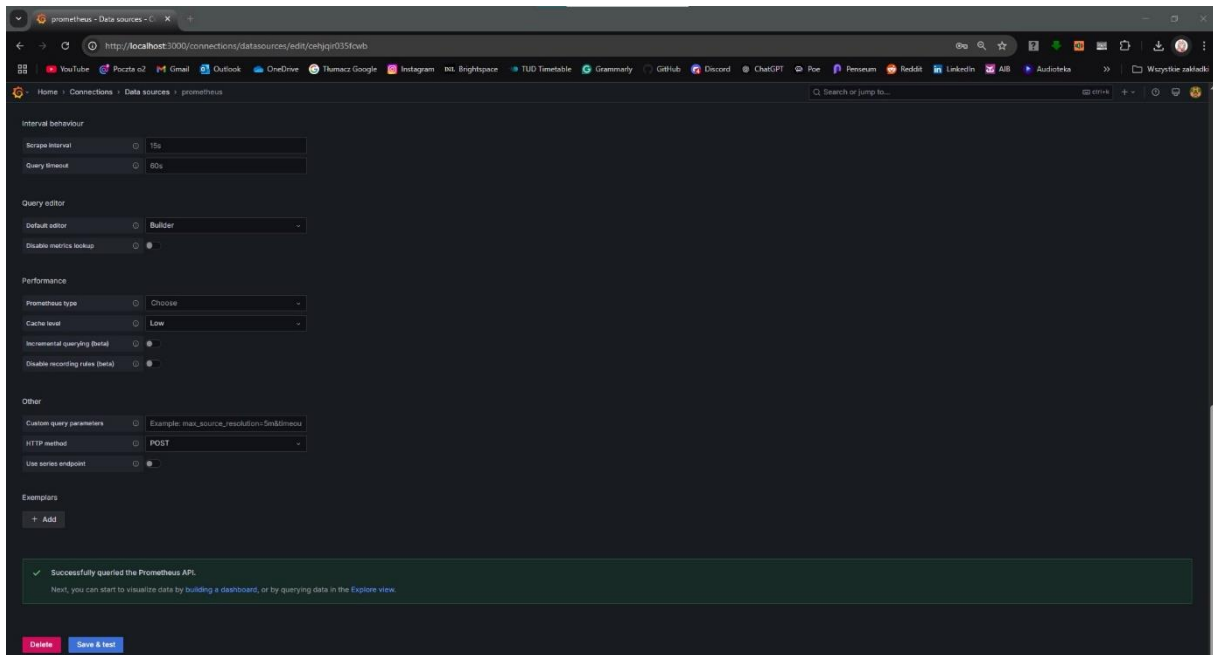


5. ADDING PROMETHEUS AS DATA SOURCE IN GRAFANA

Prometheus was added as a data source in Grafana.



The connection test passed, allowing Grafana to access Prometheus metrics.



6. CPU USAGE GRAPH IN GRAFANA

A CPU usage graph was created in Grafana using PromQL. Auto-refresh is enabled, and live data is displayed correctly.

