

Projet de Monitoring Local avec Prometheus, Windows Exporter et Grafana

1. Introduction

L'objectif de ce projet est de mettre en place une solution de supervision locale pour suivre les ressources système de mon PC personnel. Grâce à l'installation de **Prometheus**, **Windows Exporter** et **Grafana**, j'ai pu collecter, visualiser et surveiller en temps réel les métriques de base telles que le **CPU**, la **mémoire vive** et l'utilisation du **disque**.

2. Environnement de travail

- **Système d'exploitation** : Windows 10 / 11
- **Outils utilisés** :
 - Prometheus
 - Windows Exporter
 - Grafana
- **Type d'installation** : locale (tout fonctionne sur ma propre machine)

3. Installation et configuration

3.1 Installation de Prometheus

1. Téléchargement depuis le site officiel : <https://prometheus.io>

Operating system: popular Architecture: popular

prometheus
The Prometheus monitoring system and time series database. [prometheus/prometheus](#)

3.3.0-rc.1 / 2025-04-02 Pre-release [Release notes](#)

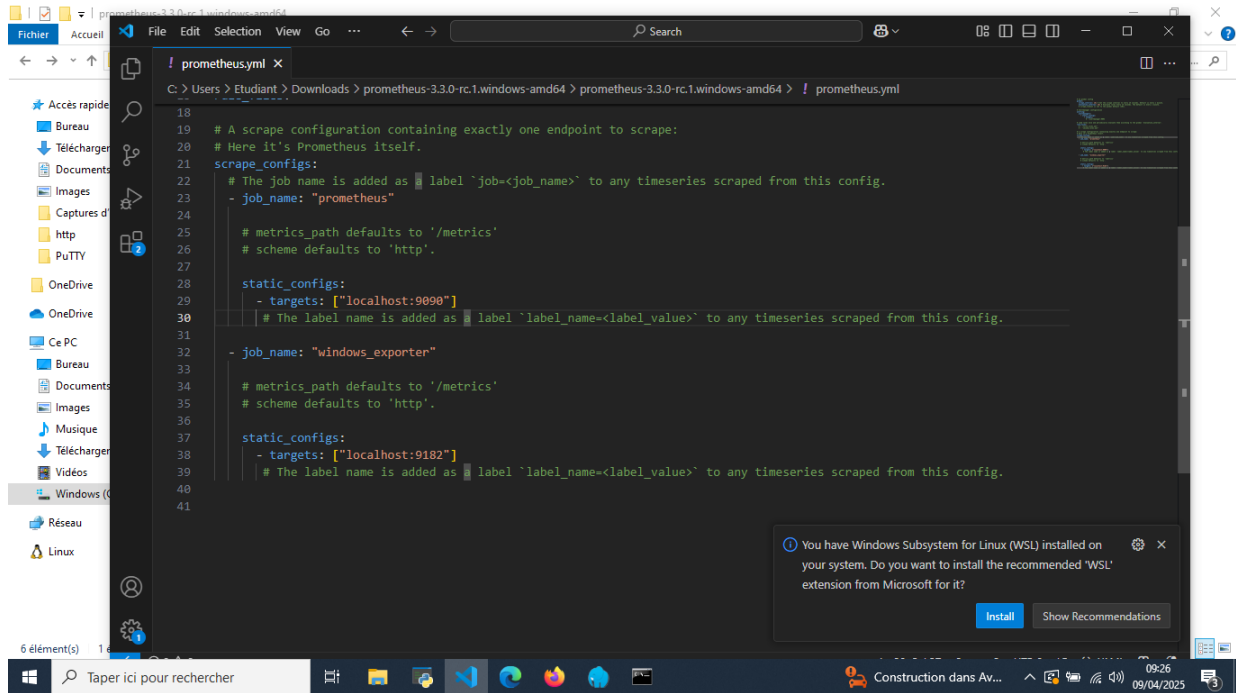
File name	OS	Arch	Size	SHA256 Checksum
prometheus-3.3.0-rc.1.darwin-amd64.tar.gz	darwin	amd64	112.98 MiB	b42836b3997bc608cfaFd299dFb3876ddda65fd79d432839e3a99042d11b26
prometheus-3.3.0-rc.1.darwin-arm64.tar.gz	darwin	arm64	108.89 MiB	8a4921a662f57db474c5b7b71214d7f821fa6cF8de59636a3bd579dbace1c1
prometheus-3.3.0-rc.1.linux-amd64.tar.gz	linux	amd64	111.25 MiB	8f442c353c5d9a72f8288304887935b40211b0dc747bb04cbdded4f0408cb
prometheus-3.3.0-rc.1.windows-amd64.zip	windows	amd64	114.94 MiB	2468cf5a2e9e47f9c82558dabe75913ced295de093eadf4ed09cf8936477431a

3.2.1 / 2025-02-25 [Release notes](#)

File name	OS	Arch	Size	SHA256 Checksum
prometheus-3.2.1.darwin-amd64.tar.gz	darwin	amd64	110.48 MiB	e73ecf2ccd3ecca4bba8f2f82f82c8c51d190283217c6807b41bf2478e4e402
prometheus-3.2.1.darwin-arm64.tar.gz	darwin	arm64	106.84 MiB	f71d933be340486e27625a9b88c7be8282a5c8dbb041594ba2e52a4788dc6ebb
prometheus-3.2.1.linux-amd64.tar.gz	linux	amd64	108.87 MiB	a622e3007c9189a7f470e1433cbd29bF392596715cf7eea8b81b37fa9d26b7be

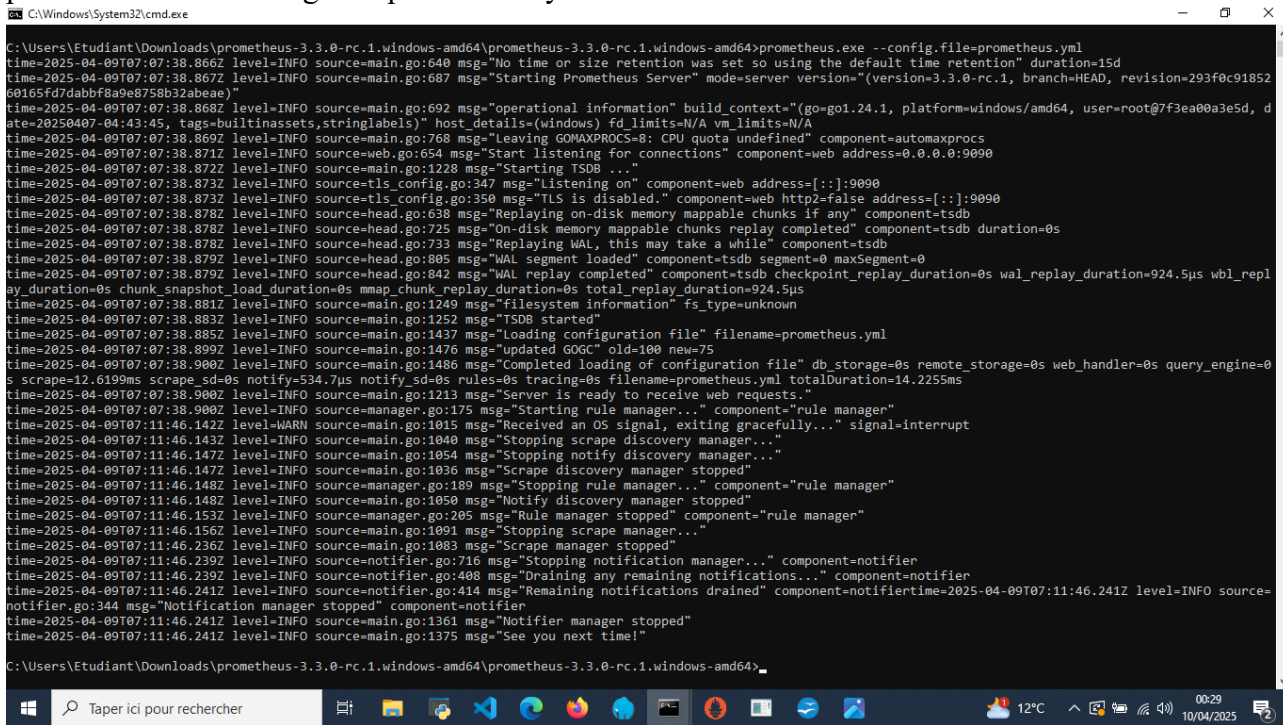
2. Extraction de l'archive dans un dossier C : \Prometheus

3. Configuration du fichier `prometheus.yml` :



4. Lancement avec la commande :

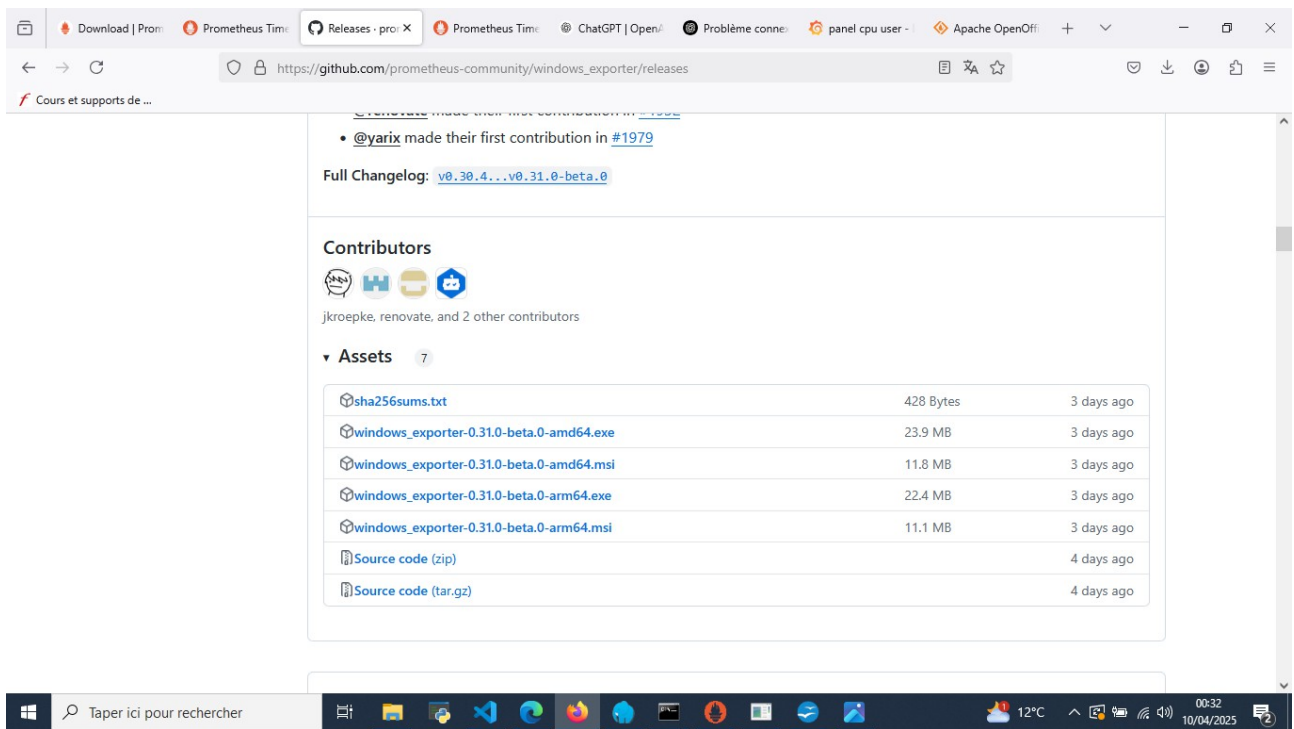
```
prometheus.exe --config.file=prometheus.yml
```



3.2 Installation de Windows Exporter

- ## 1. Téléchargement depuis GitHub :

https://github.com/prometheus-community/windows_exporter/releases



2. Lancement direct de windows_exporter.exe

```
C:\Users\Etudiant\Downloads>windows_exporter-0.31.0-beta.0-amd64.exe
time=2025-04-09T07:36:10.933Z level=WARN source=os.go:111 msg="The os 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." collector=os
time=2025-04-09T07:36:10.934Z level=WARN source=cs.go:77 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." collector=cs
time=2025-04-09T07:36:12.252Z level=INFO source=net.go:288 msg="nic/addresses collector is in an experimental state! The configuration and metrics may change in future. Please report any issues." collector=net
time=2025-04-09T07:36:12.260Z level=INFO source=main.go:269 msg="Running as OR-SC-ETU\\Etudiant"
time=2025-04-09T07:36:12.260Z level=INFO source=main.go:182 msg="Enabled collectors: cpu, cs, memory, logical_disk, physical_disk, net, os, service, system"
time=2025-04-09T07:36:12.261Z level=INFO source=main.go:208 msg="Starting windows_exporter in 1.338351s" version=0.31.0-beta.0 branch=HEAD revision=ba605cfffce3503645bb57542bb4666202244d1 goversion=go1.24.2 builddate=20250406-11:45:01 maxprocs=8
time=2025-04-09T07:36:12.262Z level=INFO source=tls_config.go:347 msg="Listening on" address=[::]:9182
time=2025-04-09T07:36:12.262Z level=INFO source=tls_config.go:350 msg="TLS is disabled." http2=false address=[::]:9182
time=2025-04-09T19:48:30.935Z level=WARN source=service.go:359 msg="failed to get process start time" collector=service service=sppsvc err="failed to open process Paramètre incorrect."
```

3. Vérification de l'accès à l'URL :

```
# HELP go_build_info Build information about the main Go module.
# TYPE go_build_info gauge
go_build_info{checksum="",path="github.com/prometheus-community/windows_exporter",version="v0.31.0-beta.0+dirty"} 1
# 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
go_gc_duration_seconds{quantile="0.25"} 0
go_gc_duration_seconds{quantile="0.5"} 0
go_gc_duration_seconds{quantile="0.75"} 0.0005193
go_gc_duration_seconds{quantile="1"} 0.0222098
go_gc_duration_seconds_sum 7.0517393
go_gc_duration_seconds_count 4143
# HELP go_gc_gogc_percent Heap size target percentage configured by the user, otherwise 100. This value is set by the GOGC 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 GOMEMLIMIT 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 17
# HELP go_info Information about the Go environment.
# TYPE go_info gauge
go_info{version="go1.24.2"} 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 3.639896e+06
# 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 7.32425856e+09
# 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 1.596812e+06
# HELP go_memstats_frees_total Total number of heap objects frees. Equals to /gc/heap/frees:objects + /gc/heap/tiny/allocs:objects.
# TYPE go_memstats_frees_total counter
go_memstats_frees_total 1.11184566e+08
# 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
```

Download | Prometheus Time Series | Releases · prometheus · Prometheus Time Series | ChatGPT | OpenAI | Problème connexion v | panel cpu use | Apache Open | localhost9182/ X

localhost9090/targets

Cours et supports de ...

Prometheus

Query Alerts Status > Target health

1 / 1 up

Select scrape pool

Filter by target health

Filter by endpoint or labels

prometheus

1 / 1 up

Endpoint	Labels	Last scrape	State
http://localhost:9090/metrics	instance="localhost:9090" job="prometheus"	13.674s ago 21ms	UP

windows_exporter

1 / 1 up

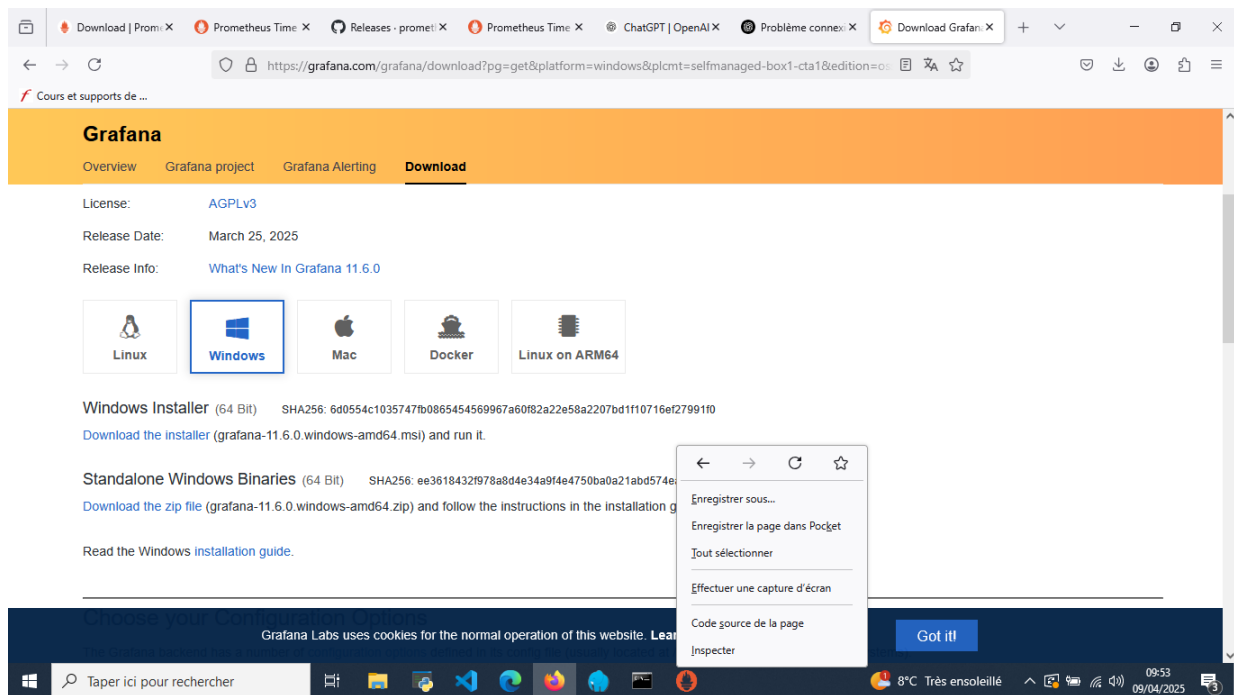
Endpoint	Labels	Last scrape	State
http://localhost:9182/metrics	instance="localhost:9182" job="windows_exporter"	13.058s ago 150ms	UP

Taper ici pour rechercher

8°C Très ensoleillé 09:36 09/04/2025

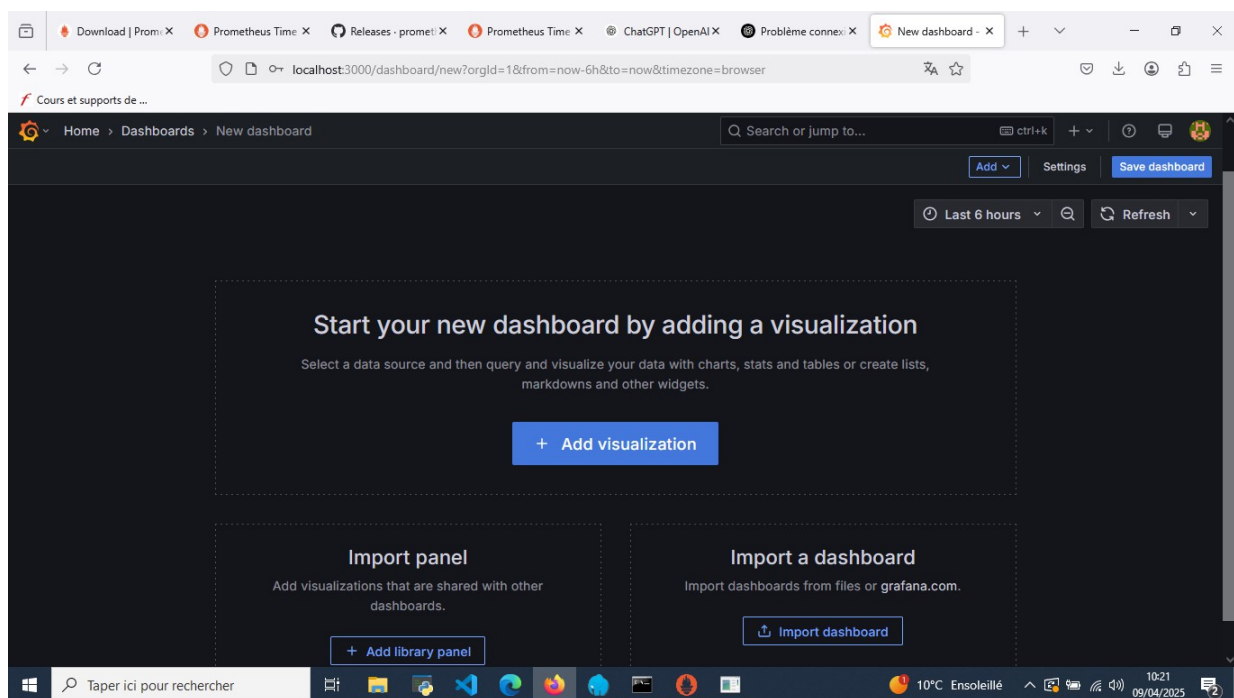
3.3 Installation de Grafana

1. Téléchargement depuis <https://grafana.com>

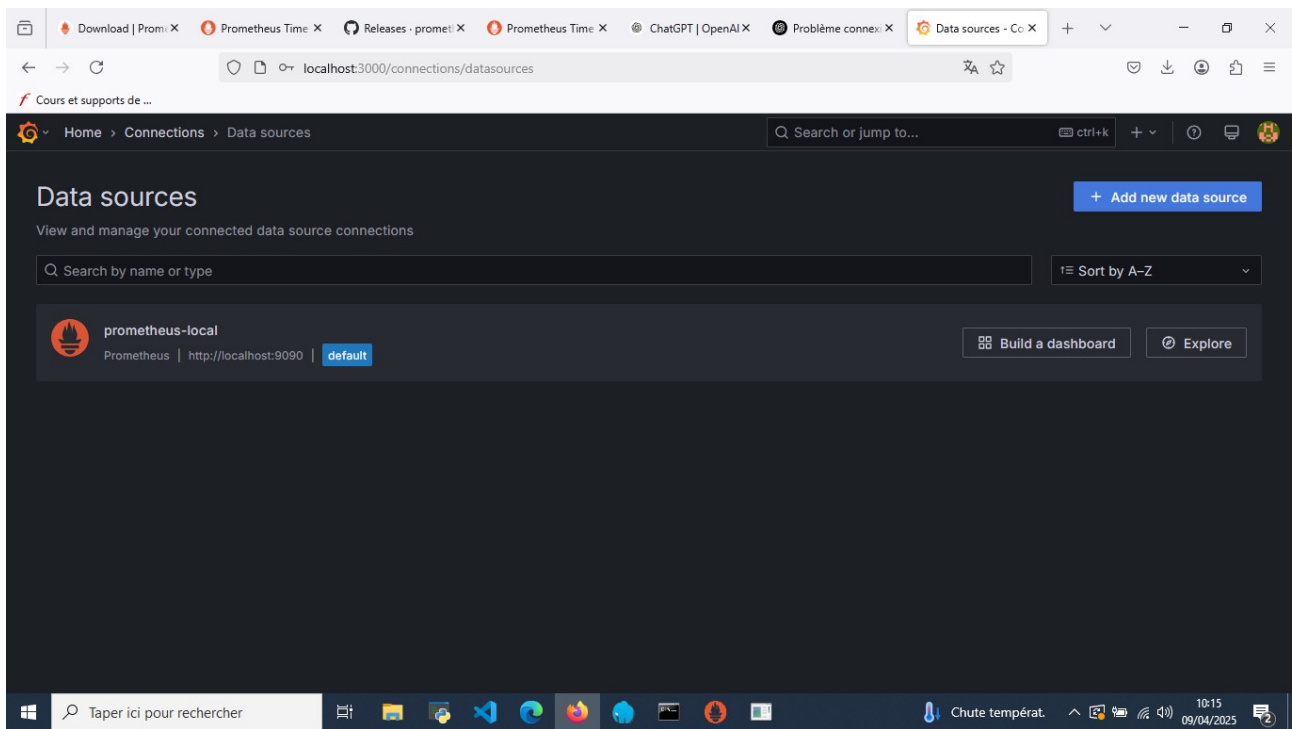


2. Installation standard sous Windows

3. Accès à Grafana via <http://localhost:3000>



4. Ajout de Prometheus comme **Data Source** via Settings > Data Sources

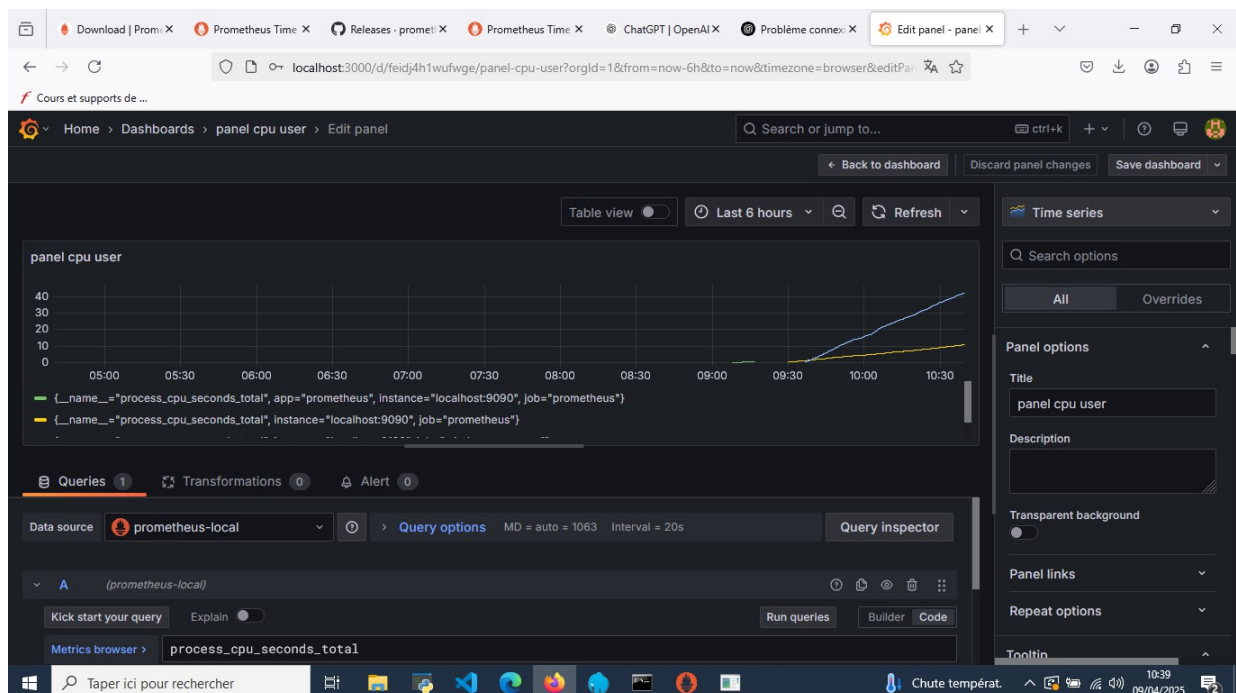


4. Création du dashboard Grafana

4.1 Panels intégrés

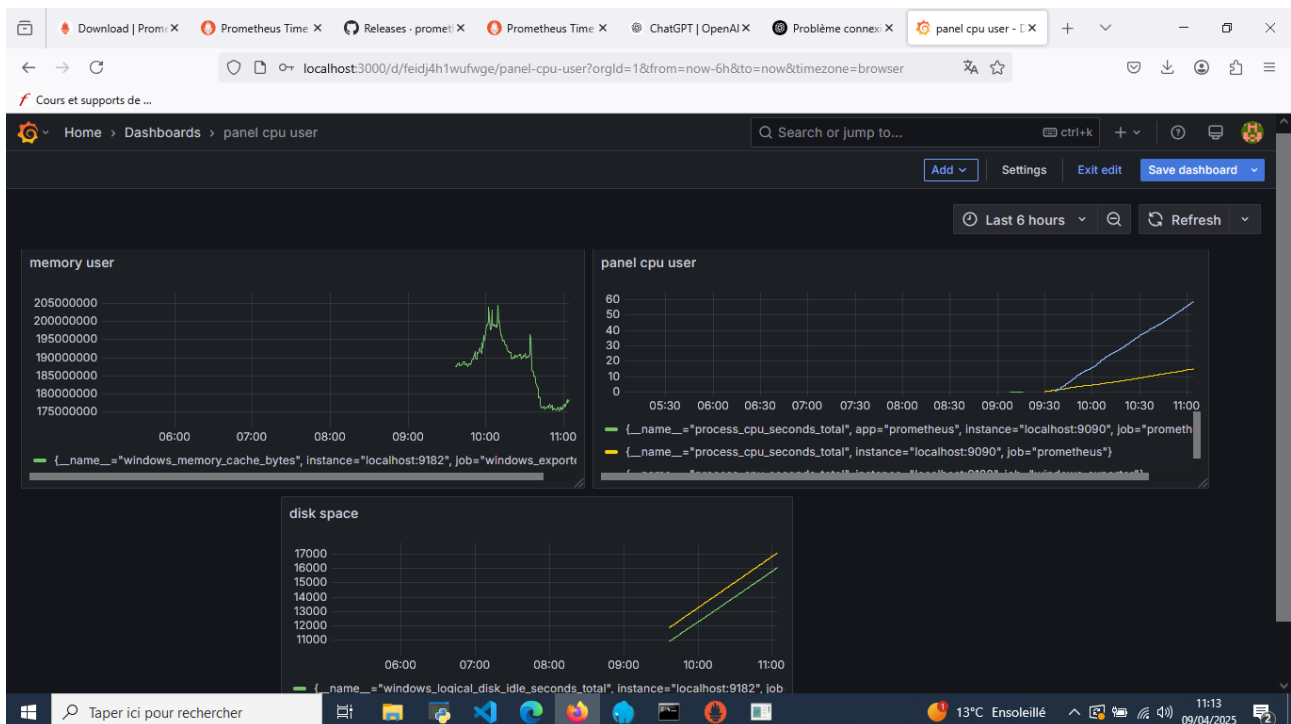
J'ai créé un dashboard personnalisé intitulé "**Monitoring Local PC**" avec les éléments suivants :

- **Utilisation CPU** (Graphique + Jauge)



- **Mémoire RAM utilisée**

- Espace disque disponible
- Taux de charge CPU par cœur



4.2 Design et lisibilité

Description du dashboard Grafana

Ce tableau de bord Grafana a été conçu pour visualiser en temps réel l'état des ressources système de mon PC local grâce aux métriques collectées par **Prometheus** via le **Windows Exporter**. Il regroupe trois panels principaux, chacun dédié à une ressource clé :

1. Panel "memory user"

- **Métrique utilisée** : `windows_memory_cache_bytes`
- **Source** : Windows Exporter via Prometheus (`localhost:9182`)
- **Affichage** : Courbe montrant l'évolution de la mémoire cache utilisée.
- **Utilité** : Permet de suivre l'utilisation de la mémoire cache et détecter les pics ou fuites potentielles de mémoire.

2. Panel "panel cpu user"

- **Métriques utilisées** : `process_cpu_seconds_total` (plusieurs instances)
- **Sources** : Prometheus (`localhost:9090`) et autres process locaux
- **Affichage** : Courbes représentant l'utilisation CPU par différents processus.
- **Utilité** : Utile pour surveiller la charge CPU générée par Prometheus ou d'autres services, et identifier ceux qui consomment le plus de ressources.

3. Panel "disk space"

- **Métrique utilisée** : `windows_logical_disk_idle_seconds_total`
- **Source** : Windows Exporter (`localhost:9182`)
- **Affichage** : Courbe représentant le temps d'inactivité des disques.
- **Utilité** : Fournit une vue indirecte de l'activité disque — moins il y a d'inactivité, plus le disque est sollicité.
-

5. Alertes et notifications

5.1 Seuils d'alerte définis

Ressource	Condition	Seuil	Justification
CPU	<code>avg(rate(process_cpu_seconds_total[1m])) > 0.8</code>	> 80%	Charge élevée à surveiller
RAM	<code>windows_os_physical_memory_free_bytes < 1Go</code>	< 1 Go	Risque de saturation mémoire
Disque	<code>windows_logical_disk_free_bytes < 5Go</code>	< 5 Go	Manque d'espace sur le disque

5.2 Configuration des alertes

Création dans Prometheus ou Grafana Alerts

The screenshot shows the Grafana Alerts configuration page for an alert named 'warning'. The alert is currently in a 'Normal' state. The configuration includes a query for the Prometheus local source, a threshold of 80, and a series named 'Series 1' with a value of 0. The alert condition is set to 'Alert condition'.

Home > Alerting > Monitoring Local > new > warning

Search or jump to...

Warning Normal

Evaluation Interval: Every 1m

Query and conditions

Instances: 1

History

Details

Versions

A prometheus-local 12m to now

View in Explore

100 - (avg(rate(windows_cpu_time_total(mode="idle")[5m])) * 100)

Table

100 - (avg(rate(windows_cpu_time_total(mode="idle")[5m])) * 100) 72.11691

C Threshold

Alert condition

Input A Is above 80

Series 1 0 Normal

Download | Prometheus Time x Releases · prometheus x Prometheus Time x Problème connexion x New recording rule x Edit rule - Alert rule x

localhost:3000/alerting/beihgx0i4sdmoa/edit

Home > Alerting > Alert rules > Edit rule

2. Define query and alert condition

Define query and alert condition [Need help?](#)

prometheus-local Options 10 minutes, MD = 43200, Min. Interval = 1s

Kick start your query Explain Run queries Builder Code

Metrics browser > `100 * (1 - (windows_memory_available_bytes < 1073741824))`

1 * (- (windows_memory_available_bytes < 1073741824))
Fetch all series matching metric name and label filters.

> Options Legend: Auto Format: Time series Step: auto Type: Instant

Table

No data

Alert condition

WHEN QUERY IS BELOW 1

No data

Preview alert rule condition

Download | Prometheus Time x Releases · prometheus x Prometheus Time x Problème connexion x New recording rule x DISQUE - new - M x

localhost:3000/alerting/grafana/ceihq383hzb4f/view

Home > Alerting > Monitoring Local > new > DISQUE

DISQUE Normal

Evaluation Interval Every 1m Edit More

Query and conditions Instances 1 History Details Versions

A prometheus-local 12m to now View in Explore

`100 * (1 - (windows_logical_disk_free_bytes < 5368709120))`

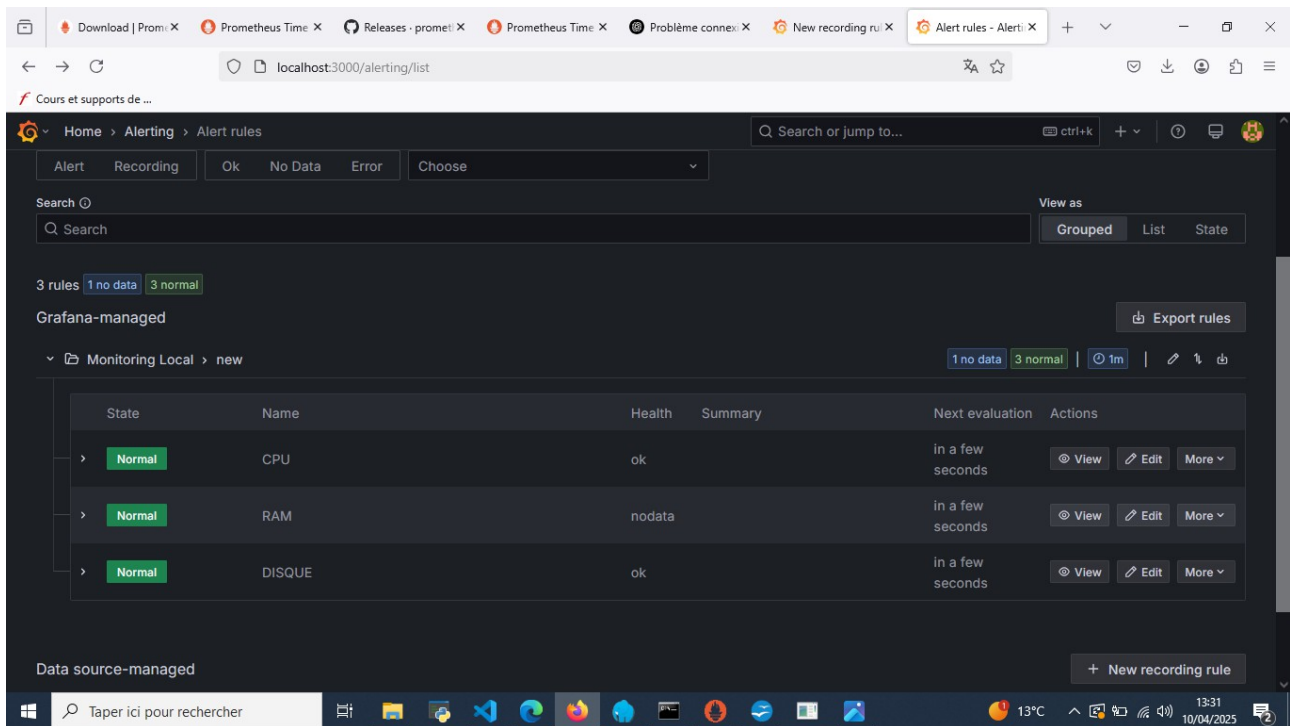
Table

{instance="localhost:9182", job="windows_exporter", volume="HarddiskVolume4"}	-202165452700
---	---------------

C Threshold Alert condition

Input A Is above 80

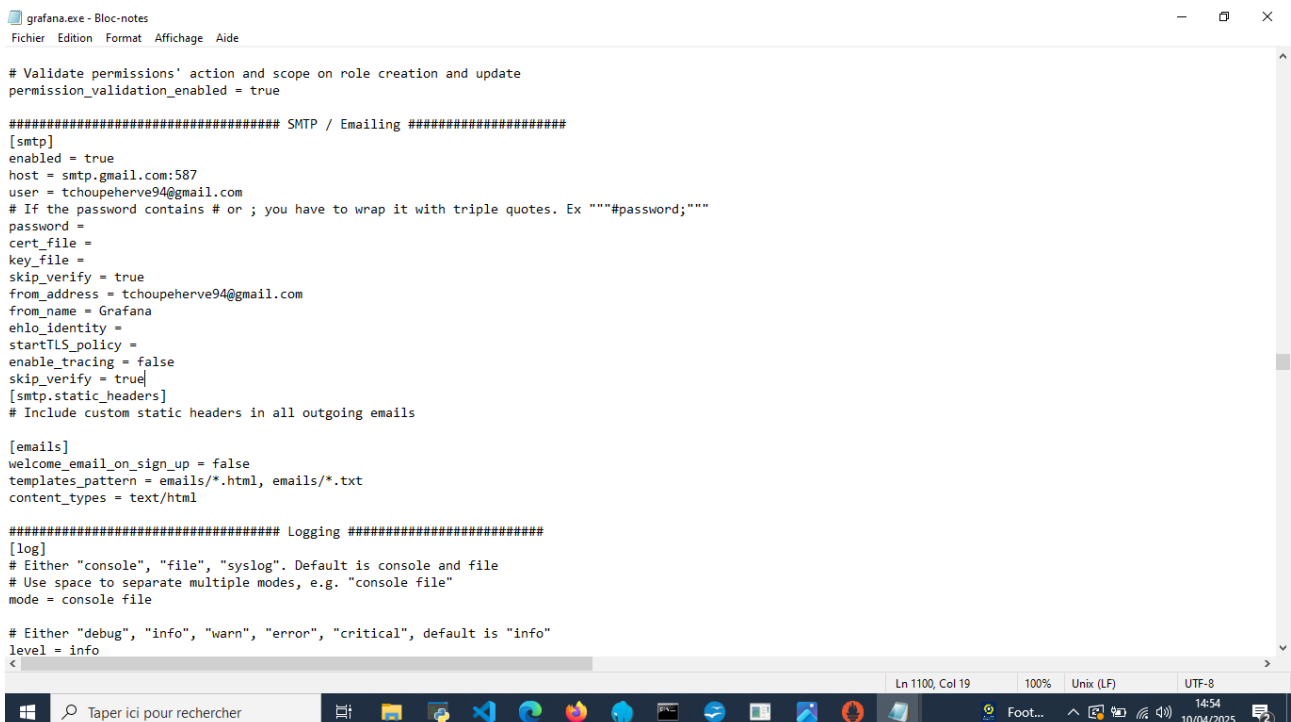
{instance="localhost:9182", job="windows_exporter", volume="HarddiskVolume4"} 0 Normal

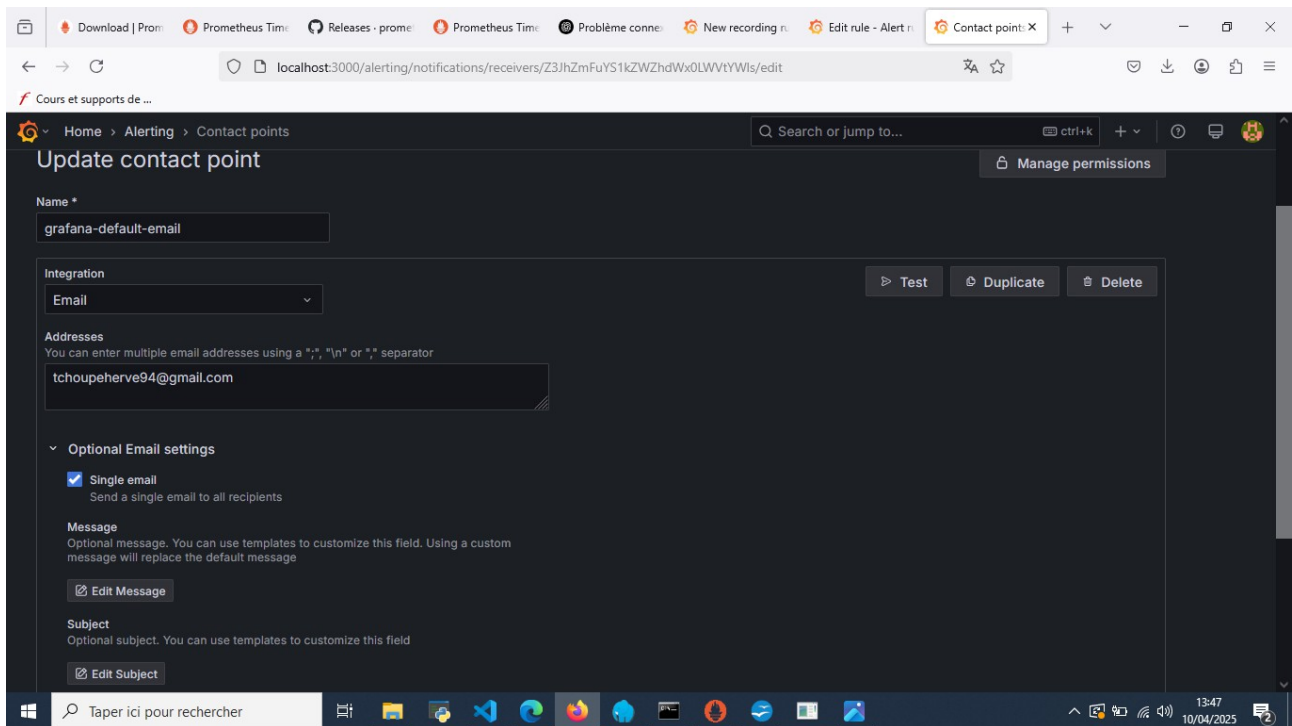


Notre travail sera accompagne d'un fichier yaml ou se trouve les configuration des alerte

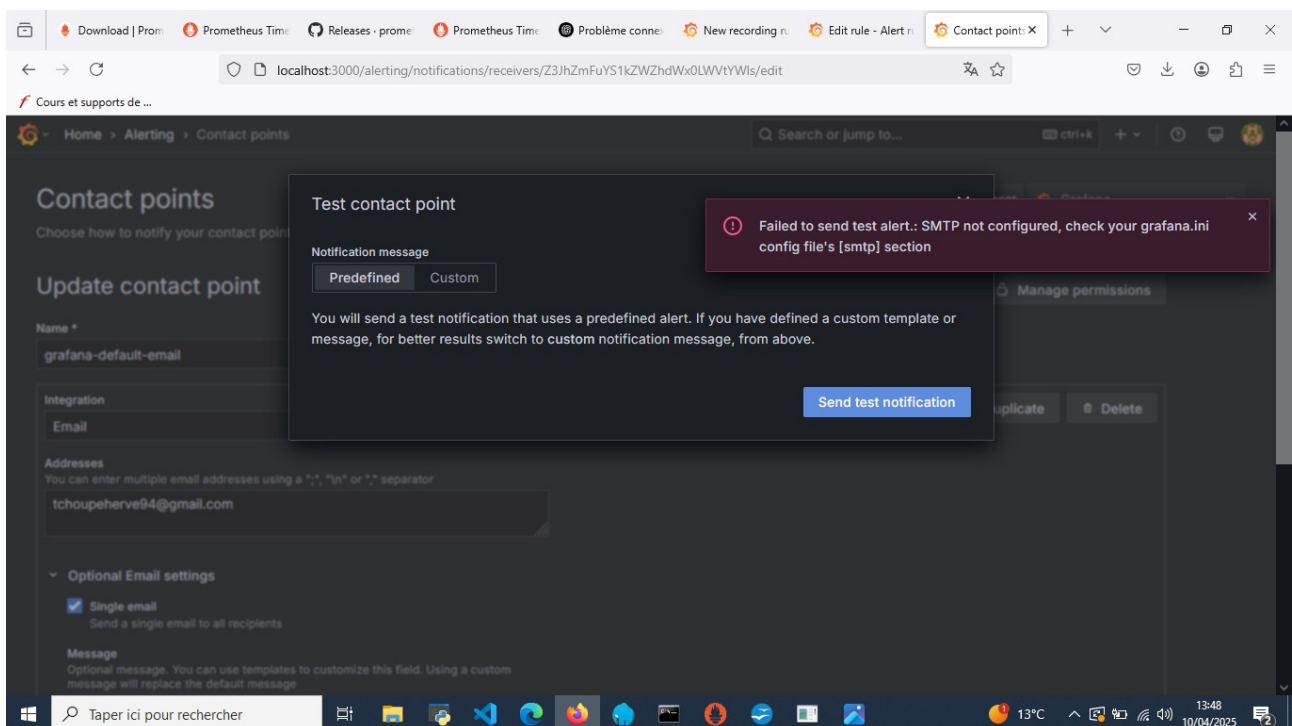
5.3 Notification par email (ou Slack)

- Configuration d'un canal de notification email (SMTP)





- Test de déclenchement d'alerte (en simulant une charge CPU élevée)



voilà la difficulté que je rencontre ce qui m'en peche de conclure et menée a bien mon projet

6. Conclusion

Grâce à ce projet, j'ai mis en place une **solution complète de monitoring local**. Cette infrastructure me permet de surveiller l'état de santé de mon PC en temps réel, d'anticiper les problèmes de ressources, et d'améliorer la visibilité sur l'utilisation du système