

Лабораторная работа №2.

Ход работы

Часть 1. Логирование

Commands to Run

`docker compose up -d` # Build/pull/start in detached mode

`docker compose logs -f` # Tail logs (useful for debugging Postgres issues)

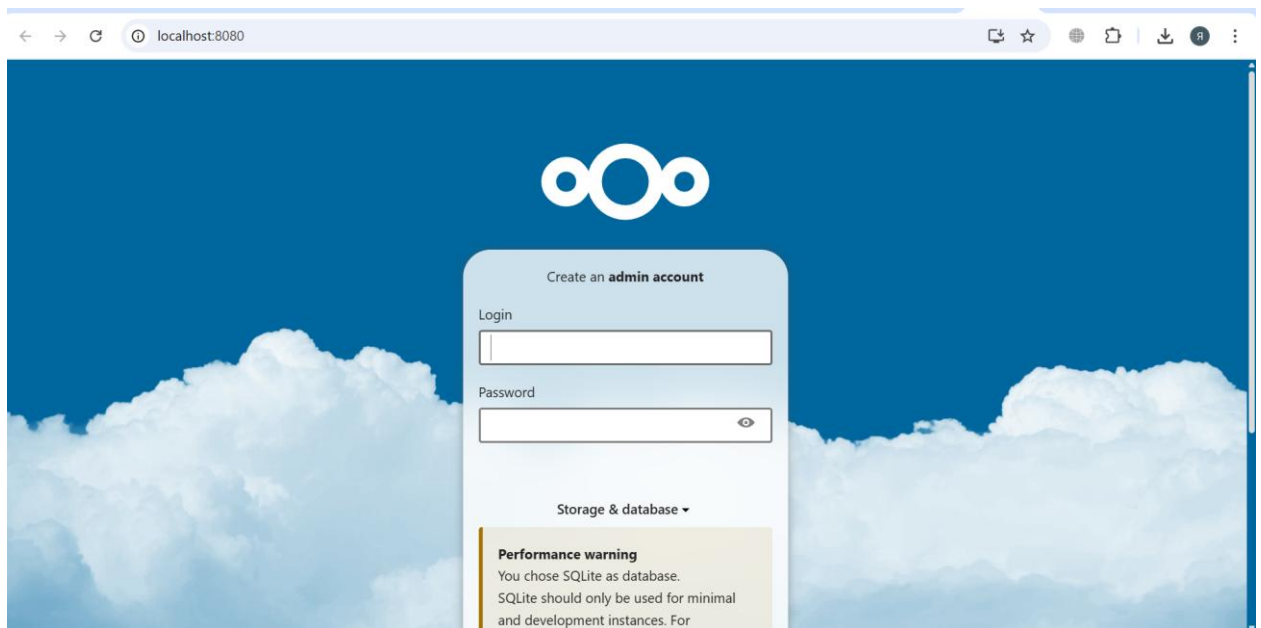
`docker compose down -v` # Stop and remove volumes (clean slate)

```
PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2> docker-compose up -d
time="2025-12-20T10:10:54+03:00" level=warning msg="C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2\docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion"
[+] Running 76/76
  ✓ zabbix-server Pulled                235.9s
  ✓ zabbix-web-nginx-pgsql Pulled       346.3s
  ✓ grafana Pulled                     135.8s
  ✓ loki Pulled                        170.4s
  ✓ postgres-zabbix Pulled              6.0s
  ✓ nextcloud Pulled                   920.3s
  ✓ promtail Pulled                    598.4s
[+] Running 10/10
  ✓ Network lab2_monitoring Created      0.1s
  ✓ Volume "lab2_nc-data" Created        0.0s
  ✓ Volume "lab2_zabbix-db" Created      0.0s
  ✓ Container grafana Started           1.5s
  ✓ Container loki Started              1.6s
  ✓ Container nextcloud Started         1.6s
  ✓ Container postgres-zabbix Started   1.5s
  ✓ Container promtail Started          1.2s
  ✓ Container zabbix-back Started       1.1s
  ✓ Container zabbix-front Started      1.1s
PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2>
```

docker ps

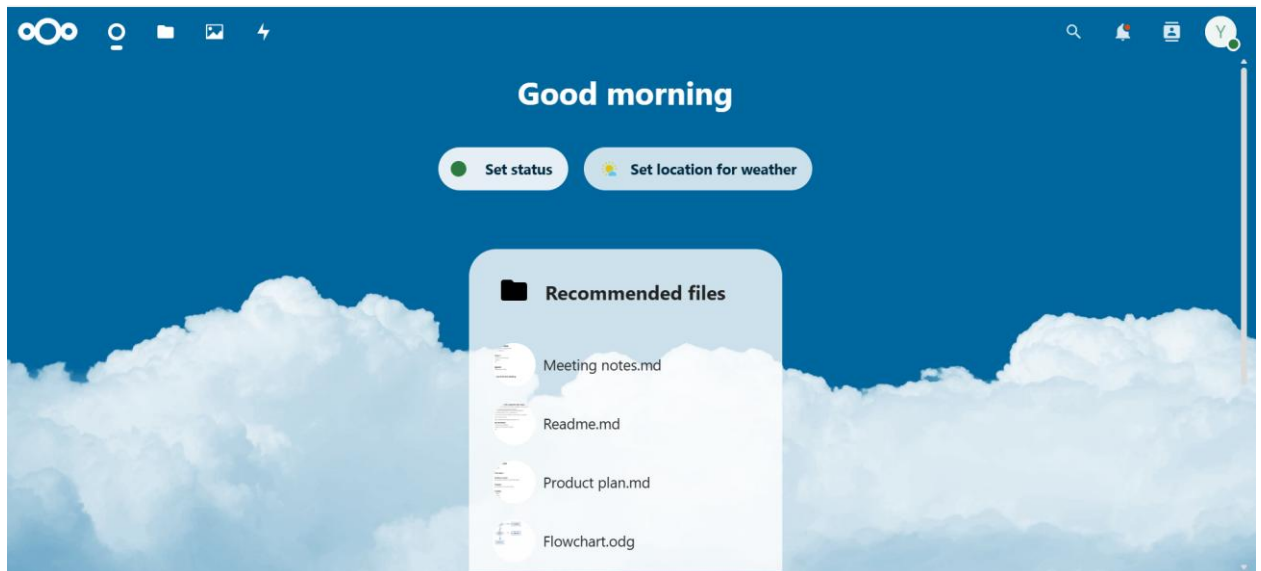
```
PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2> docker ps
CONTAINER ID   IMAGE                                     COMMAND                  CREATED        STATUS
6492b6ea6af7   zabbix/zabbix-web-nginx-pgsql:ubuntu-6.4-latest  "docker-entrypoint.sh"  About a minute ago Up About a minute (healthy)
8443/tcp, 0.0.0.0:8082->8080/tcp   zabbix-front
d44f4caace1d   zabbix/zabbix-server-pgsql:ubuntu-6.4-latest    "/usr/bin/tini -- /u..." About a minute ago Up About a minute
0.0.0.0:10051->10051/tcp           zabbix-back
107b0c85109c   grafana/promtail:2.9.0                       "/usr/bin/promtail -..." About a minute ago Up About a minute
299fd62c248c   grafana/grafana:11.2.0                       "/run.sh /run.sh"       About a minute ago Up About a minute
0.0.0.0:3000->3000/tcp             grafana
1d3c9153a336   nextcloud:29.0.6                             "/entrypoint.sh apac..." About a minute ago Up About a minute
0.0.0.0:8080->80/tcp               nextcloud
69facaadd989   grafana/loki:2.9.0                           "/usr/bin/loki -conf..." About a minute ago Up About a minute
0.0.0.0:3100->3100/tcp             loki
7afb4cde54c3   postgres:15                                   "docker-entrypoint.s..." About a minute ago Up About a minute (healthy)
5432/tcp                           postgres-zabbix
d1d2b8139d6b   yriy-backend                                "uvicorn app.main:ap..." 5 months ago    Up 40 minutes
0.0.0.0:8000->8000/tcp             yriy-backend-1
ef44d70b02fa   postgres:14                                   "docker-entrypoint.s..." 6 months ago    Up 40 minutes
0.0.0.0:5431->5432/tcp             yriy-db-1
PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2> |
```

Заходим в контейнеры и переходим по ссылке на порт 8080:



Успешно отображается веб-страница в браузере.

Создан админский аккаунт:



Получилось посмотреть, что после подключения логи пошли в файл

/var/www/html/data/nextcloud.log

`docker exec -it nextcloud tail -f /var/www/html/data/nextcloud.log`

```

C:\Users\User1>docker exec -it nextcloud tail -f /var/www/html/data/nextcloud.log
{"reqId":"KkpOdK1oYHLpw7Q6qPQc","level":2,"time":"2025-12-20T07:31:21+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":[]}
{"reqId":"KkpOdK1oYHLpw7Q6qPQc","level":2,"time":"2025-12-20T07:31:21+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":[]}
{"reqId":"KkpOdK1oYHLpw7Q6qPQc","level":3,"time":"2025-12-20T07:31:21+00:00","remoteAddr":"172.22.0.1","user":"","app":"PHP","method":"GET","url":"/","message":"fopen(/var/www/html/config/config.php): Failed to open stream: No such file or directory at /var/www/html/lib/private/Config.php#221","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{"app":"PHP"}}
{"reqId":"4TzcXKPvq6h2RULKSOXV","level":2,"time":"2025-12-20T07:33:23+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"POST","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":[]}
{"reqId":"4TzcXKPvq6h2RULKSOXV","level":2,"time":"2025-12-20T07:33:23+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"POST","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":[]}
{"reqId":"CPqJ49lsp4WNj9L3DPxz","level":2,"time":"2025-12-20T07:34:34+00:00","remoteAddr":"172.22.0.1","user":"Yaroslavan","app":"appstoreFetcher","method":"GET","url":"/settings/apps/list","message":"Could not connect to appstore: cURL error 28: Connection timed out after 60001 milliseconds (see https://curl.haxx.se/libcurl/c/libcurl-errors.html) for https://apps.nextcloud.com/api/v1/apps.json","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"29.0.6.1","data":{"app":"appstoreFetcher"}}
{"reqId":"CPqJ49lsp4WNj9L3DPxz","level":2,"time":"2025-12-20T07:34:34+00:00","remoteAddr":"172.22.0.1","user":"Yaroslavan","app":"appstoreFetcher","method":"GET","url":"/settings/apps/list","message":"Could not get apps from the appstore","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"29.0.6.1","data":{"app":"appstoreFetcher"}}

```

Найдем файл с логами среди подключенных:

`docker logs -f promtail`

```

level=info ts=2025-12-29T14:16:47.209262281Z caller=server.go:322 http=[:]:9080 grpc=[:]:41947 msg="server listening on addresses"
level=info ts=2025-12-29T14:16:47.217413017Z caller=main.go:174 msg="Starting Promtail" version="(version=2.9.0, branch=HEAD, revision=2feb64f69)"
level=warn ts=2025-12-29T14:16:47.217793439Z caller=promtail.go:263 msg="enable watchConfig"
level=info ts=2025-12-29T14:16:52.208854918Z caller=filetargetmanager.go:361 msg="Adding target" key="/opt/nc_data/*.log:{job=\"nextcloud_logs\"}"
level=info ts=2025-12-29T14:16:52.209041757Z caller=filetarget.go:313 msg="watching new directory" directory=/opt/nc_data
ts=2025-12-29T14:16:52.209196839Z caller=log.go:168 level=info msg="Seeked /opt/nc_data/nextcloud.log - &{Offset:3492 Whence:0}"
level=info ts=2025-12-29T14:16:52.209216018Z caller=tailer.go:149 component=tailer msg="tail routine started" path=/opt/nc_data/nextcloud.log
level=info ts=2025-12-29T14:17:12.097404533Z caller=filetargetmanager.go:181 msg="received file watcher event" name=/opt/nc_data/owncloud.db-wal op=CREATE
level=info ts=2025-12-29T14:17:12.097474876Z caller=filetargetmanager.go:181 msg="received file watcher event" name=/opt/nc_data/owncloud.db-shm op=CREATE
level=info ts=2025-12-29T14:17:12.600390658Z caller=filetargetmanager.go:181 msg="received file watcher event" name=/opt/nc_data/owncloud.db-wal op=CREATE
level=info ts=2025-12-29T14:17:12.600424453Z caller=filetargetmanager.go:181 msg="received file watcher event" name=/opt/nc_data/owncloud.db-shm op=CREATE

```

`docker exec nextcloud ls -la /var/www/html/data/nextcloud.log`

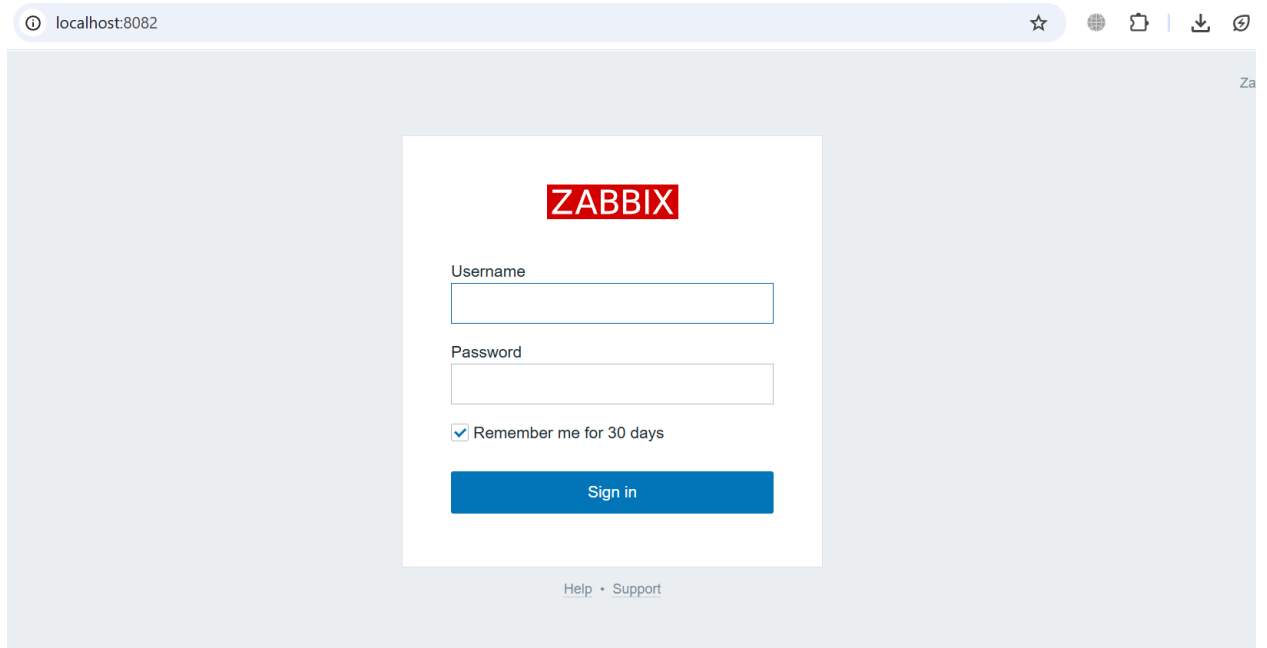
```

PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2_2> docker exec nextcloud ls -la /var/www/html/data/nextcloud.log
-rw-r----- 1 www-data www-data 6260 Jan  8 16:14 /var/www/html/data/nextcloud.log
PS C:\Users\User1\Documents\Labworks(2025-2026)\Комп сети\lab2_2> |

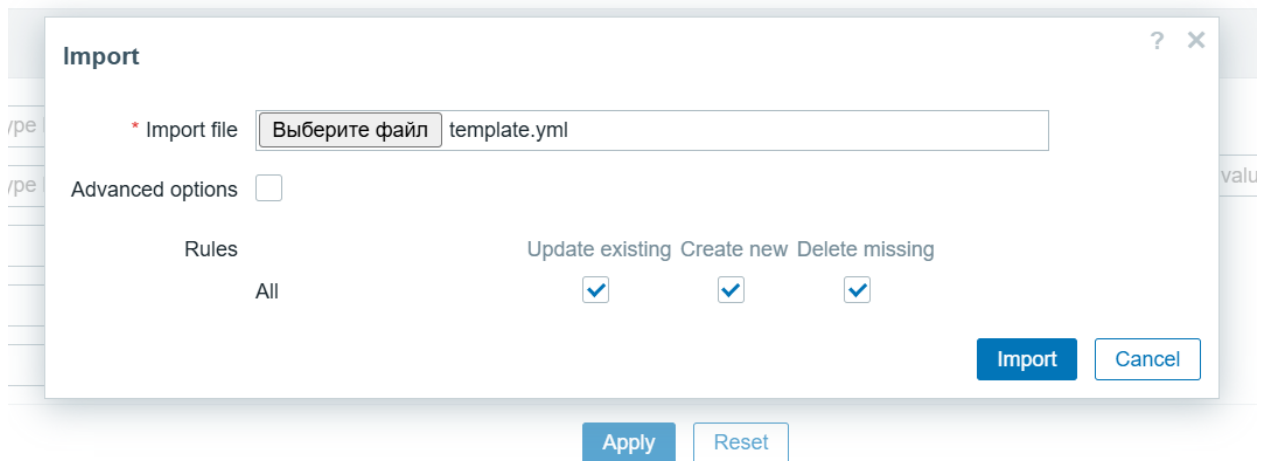
```

Часть 2. Мониторинг

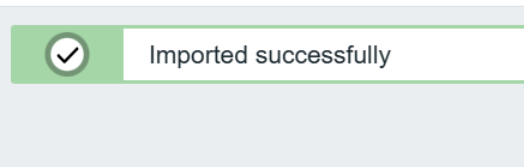
Настраиваем Zabbix: <https://localhost:8082>



Пользователь Admin, пароль Zabbix – вводим для входа, произошла успешная авторизация. Делаем импорт шаблона:



Templates



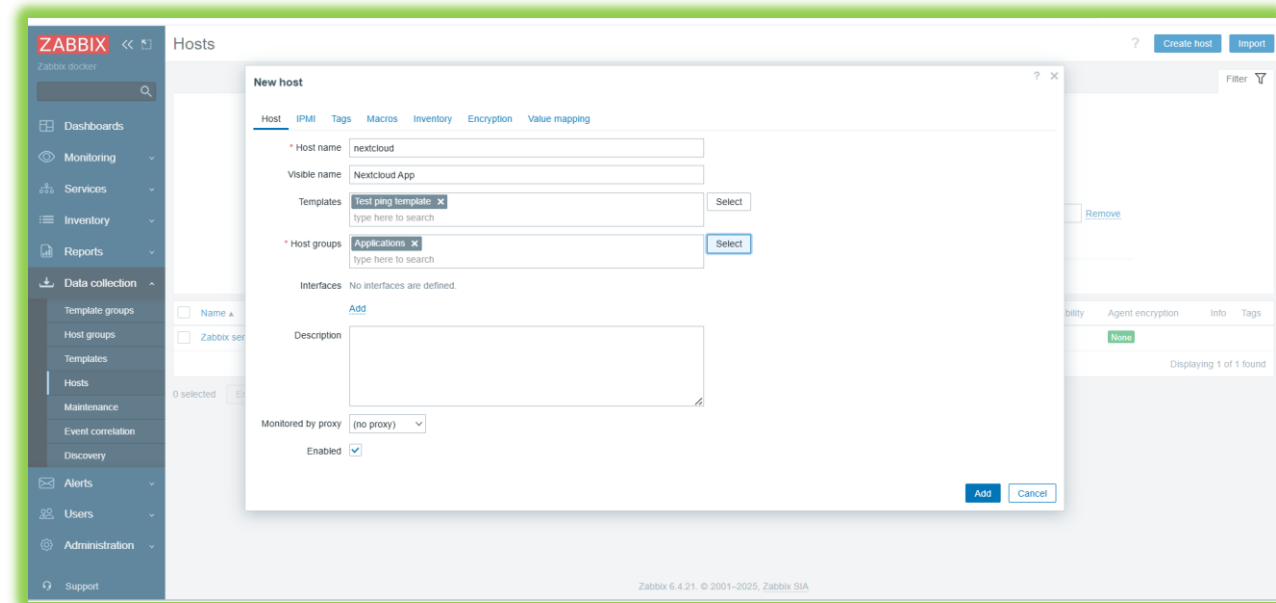
Разрешаем короткие именами в некстклауде:

`docker exec -u www-data -it nextcloud bash`

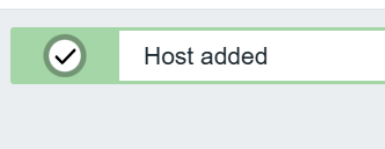
`php occ config:system:set trusted_domains 1 --value="nextcloud"`

```
C:\Users\User1>docker exec -u www-data -it nextcloud bash
www-data@1d3c9153a336:~/html$ php occ config:system:set trusted_domains 1 --value="nextcloud"
System config value trusted_domains => 1 set to string nextcloud
www-data@1d3c9153a336:~/html$
```

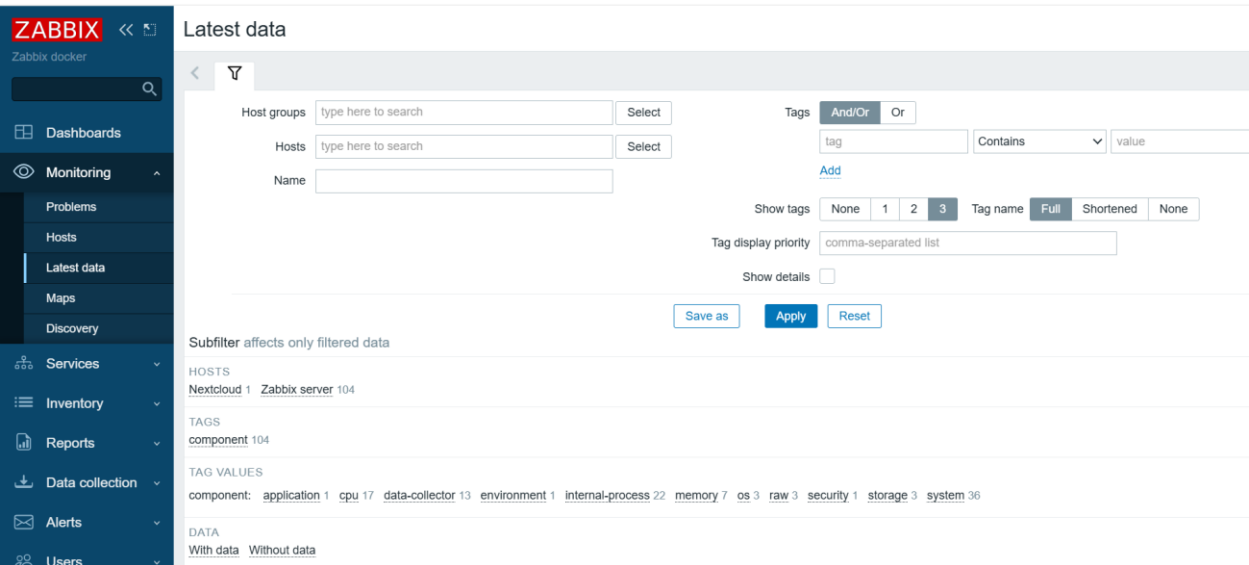
Создаем хост в Zabbix со следующими настройками:



Hosts



Перейдем в отдел мониторинга последних данных



Переменная healthy

Nextcloud App 1 Zabbix server 104						
TAGS						
component 104						
TAG VALUES						
component: application 1 cpu 17 data-collector 13 environment 1 internal-process 22 memory 7 os 3 raw 3 security 1 storage 3 system 36						
DATA						
With data Without data						
<input type="checkbox"/>	Host	Name	Last check	Last value	Change	Tags
<input type="checkbox"/>	Nextcloud App	Nextcloud: ping service	18s	healthy		History
<input type="checkbox"/>	Zabbix server	Zabbix server: Number of processed numeric (float) v...	56s	0.6992	+0.0005912	component: system Graph
<input type="checkbox"/>	Zabbix server	Zabbix server: Number of processed character value...	55s	0		component: system Graph
<input type="checkbox"/>	Zabbix server	Zabbix server: Number of processed log values per s...	54s	0		component: system Graph
<input type="checkbox"/>	Zabbix server	Zabbix server: Number of processed numeric (unsigned...	53s	0.09968	+0.00008418	component: system Graph
<input type="checkbox"/>	Zabbix server	Zabbix server: Number of processed text values per...	52s	0.03336	+0.00002847	component: system Graph

Включим в некстклауде maintenance mode

```
bash: $ \320\262 : command not found
www-data@1d3c9153a336:~/html$ php occ maintenance:mode --on
Maintenance mode enabled
www-data@1d3c9153a336:~/html$ exit
exit

What's next:
  Try Docker Debug for seamless, persistent debugging tools in any container or image → docker debug nextcloud
  Learn more at https://docs.docker.com/go/debug-cli/

C:\Users\User1>
```

Появилось сообщение про проблему в Zabbix

The screenshot shows the Zabbix Monitoring interface. On the left is a sidebar with navigation options: Dashboards, Monitoring (selected), Problems, Hosts, Latest data, Maps, Discovery, Services, Inventory, Reports, Data collection, Alerts, Users, and Administration. The main panel displays a list of problems. The first problem is for 'Nextcloud' with a severity of 'Disaster' and status 'PROBLEM'. The problem description is 'Nextcloud is in maintenance mode'. The duration is '23s'. The second problem is for 'Zabbix server' with a severity of 'Average' and status 'PROBLEM'. The problem description is 'Linux: Zabbix agent is not available (for 3m)'. The duration is '9d 8h 42m'. The interface includes filters for Triggers, Problem, Severity, Age less than, Show symptoms, Show suppressed problems, and Show unacknowledged only. It also has buttons for 'Save as', 'Apply', and 'Reset'.

```
C:\Users\User1>curl http://localhost:8080/status.php
{"installed":true,"maintenance":true,"needsDbUpgrade":false,"version":"29.0.6.1","versionstring":"29.0.6","edition":
,"productname":"Nextcloud","extendedSupport":false}
C:\Users\User1>
```

Затем выключим режим:

```
www-data@1d3c9153a336:~/html$ php occ maintenance:mode --off
Maintenance mode disabled
www-data@1d3c9153a336:~/html$
```

И посмотрим мониторинг проблем:

The screenshot shows the Zabbix Monitoring interface after the maintenance mode has been disabled. The 'Nextcloud' problem is now marked as 'RESOLVED' and its duration is '4m'. The interface includes filters for Triggers, Problem, Severity, Age less than, Show symptoms, Show suppressed problems, and Show unacknowledged only. It also has buttons for 'Save as', 'Apply', and 'Reset'.

Часть 3. Визуализация

В терминале выполним команды

```
docker exec -it grafana bash -c "grafana cli plugins install alexanderzobnin-zabbix-app"
```

```
docker restart grafana
```

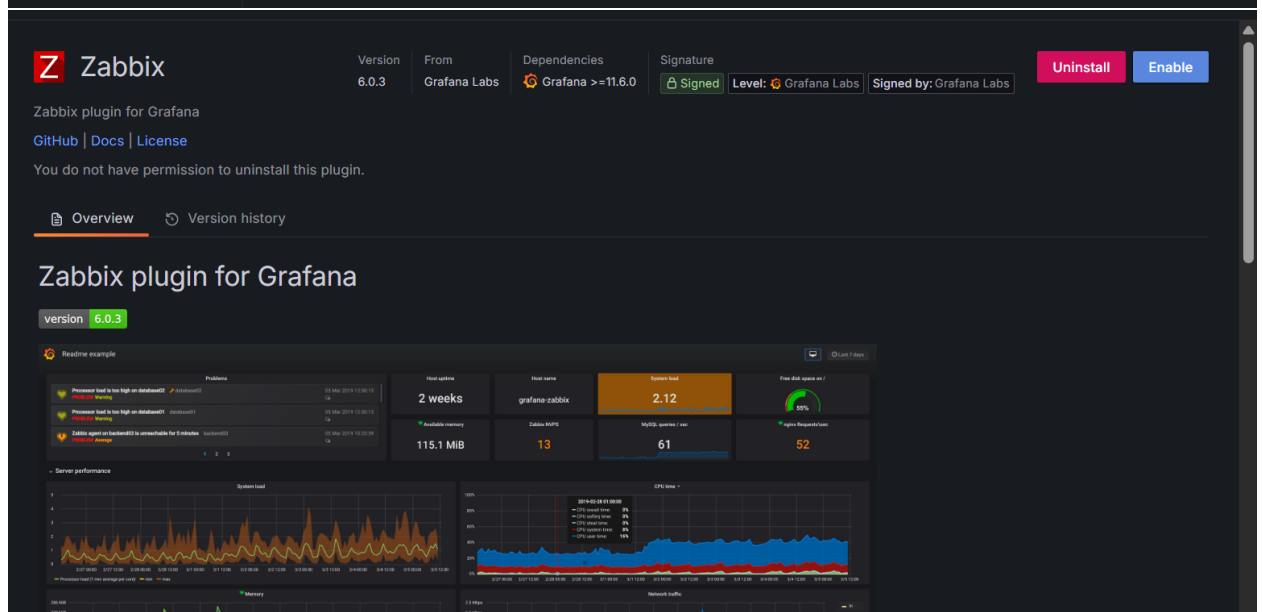
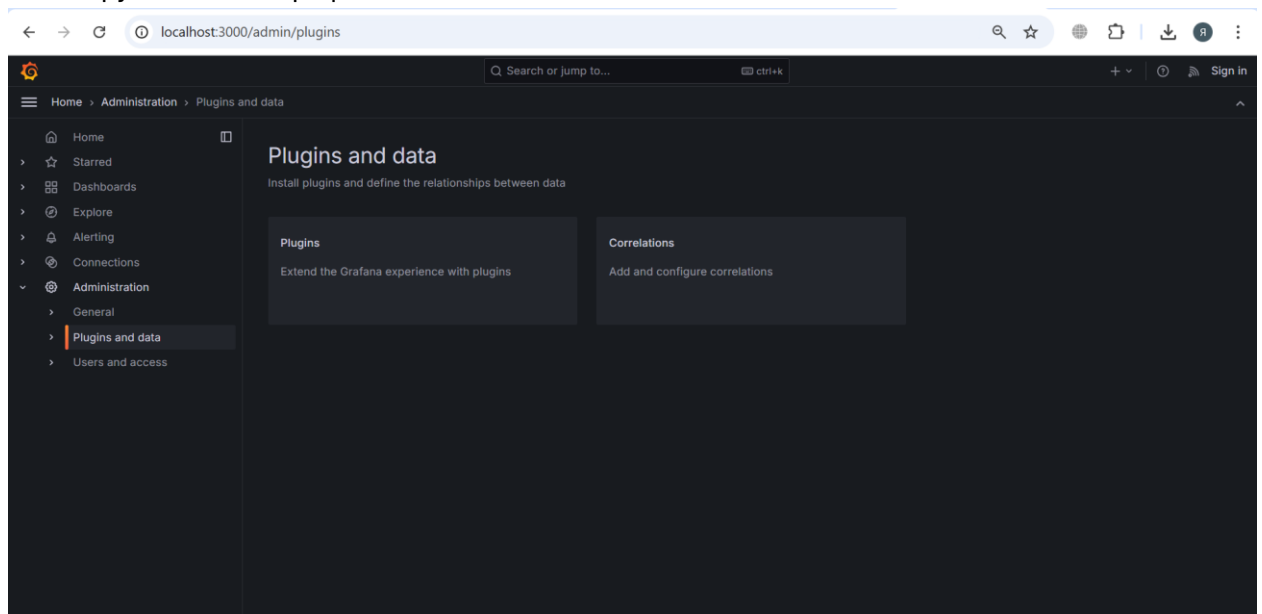
```
C:\Users\User1>docker exec -it grafana bash -c "grafana cli plugins install alexanderzobnin-zabbix-app
✓Downloaded and extracted alexanderzobnin-zabbix-app v6.0.3 zip successfully to /var/lib/grafana/plugins/alexanderzo
bnin-zabbix-app
```

```
Please restart Grafana after installing or removing plugins. Refer to Grafana documentation for instructions if neces
sary.
```

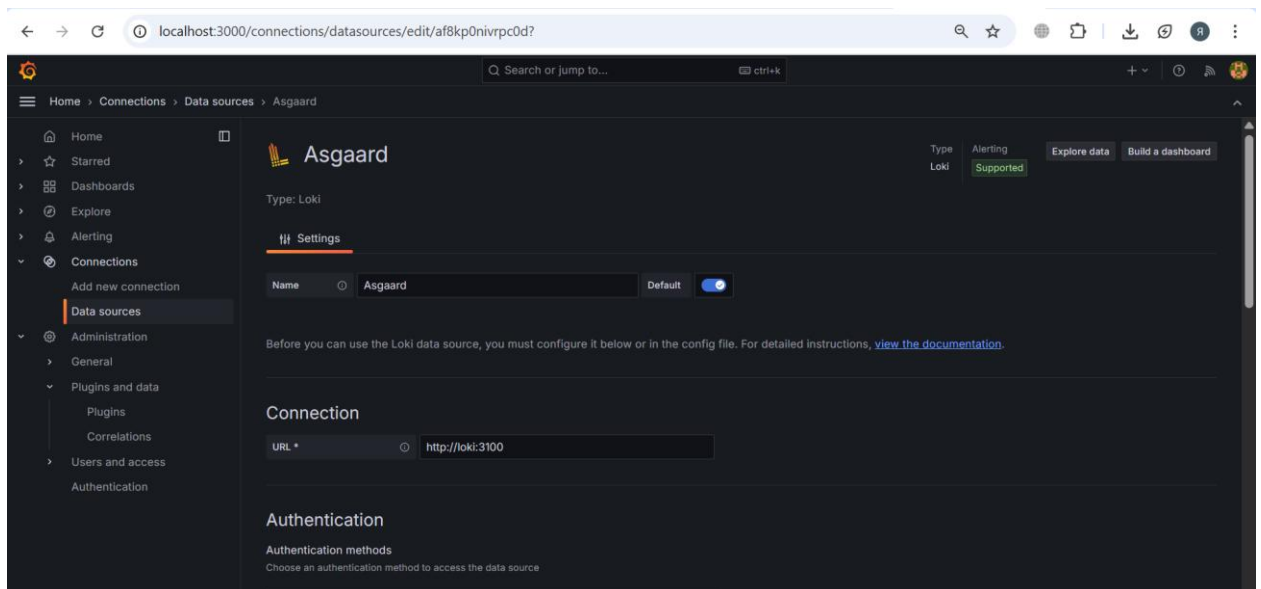
```
C:\Users\User1>docker restart grafana
grafana
```

```
C:\Users\User1>|
```

Активируем Zabbix в графоне

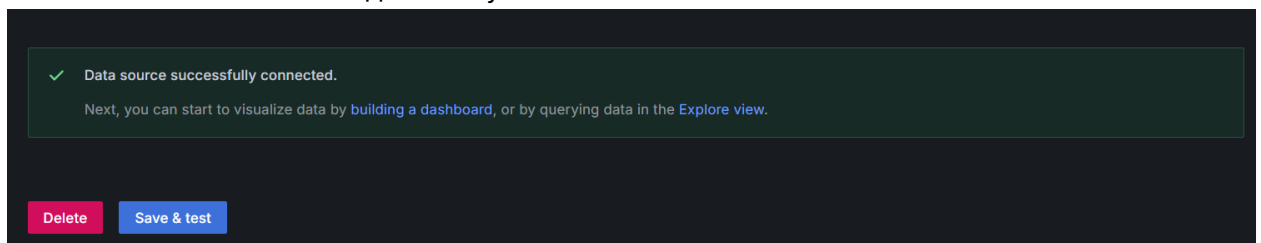


Подключаем Loki к Grafana



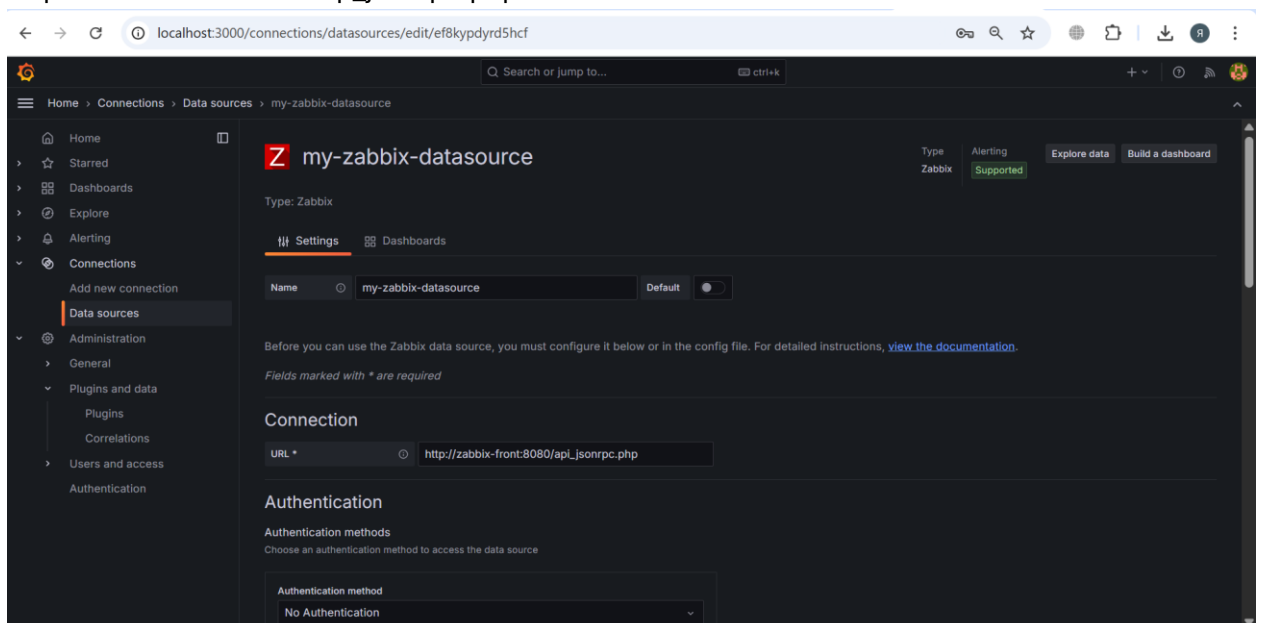
Изменено имя, url connection: https://loki:3100

Выполняем save&test и соединение установлено:

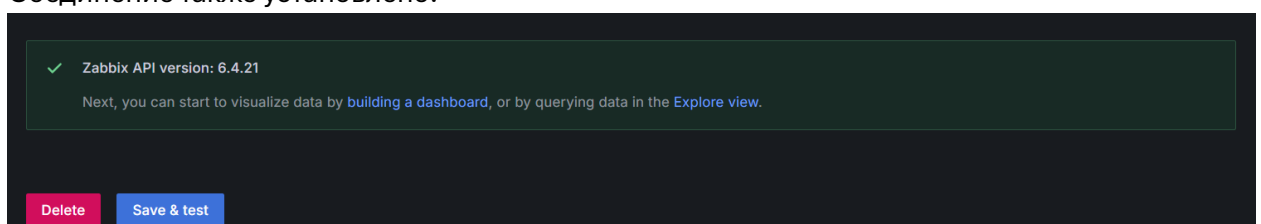


Подключаем новый data сорс Zabbix

http://zabbix-front:8080/ap_jsonrpc.php

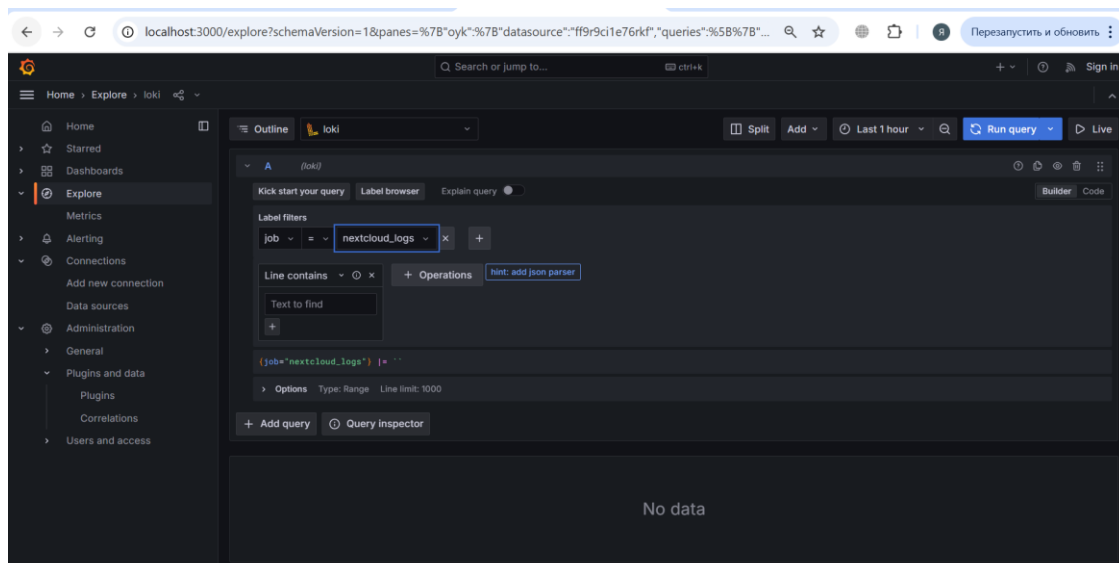


Соединение также установлено:



Explore

Логи Loki



После некоторых изменений в исходном файле для конфигурации логов в promtail (с подключением loki возникли ошибки на уровне чтения логов через promtail), он был презапущен

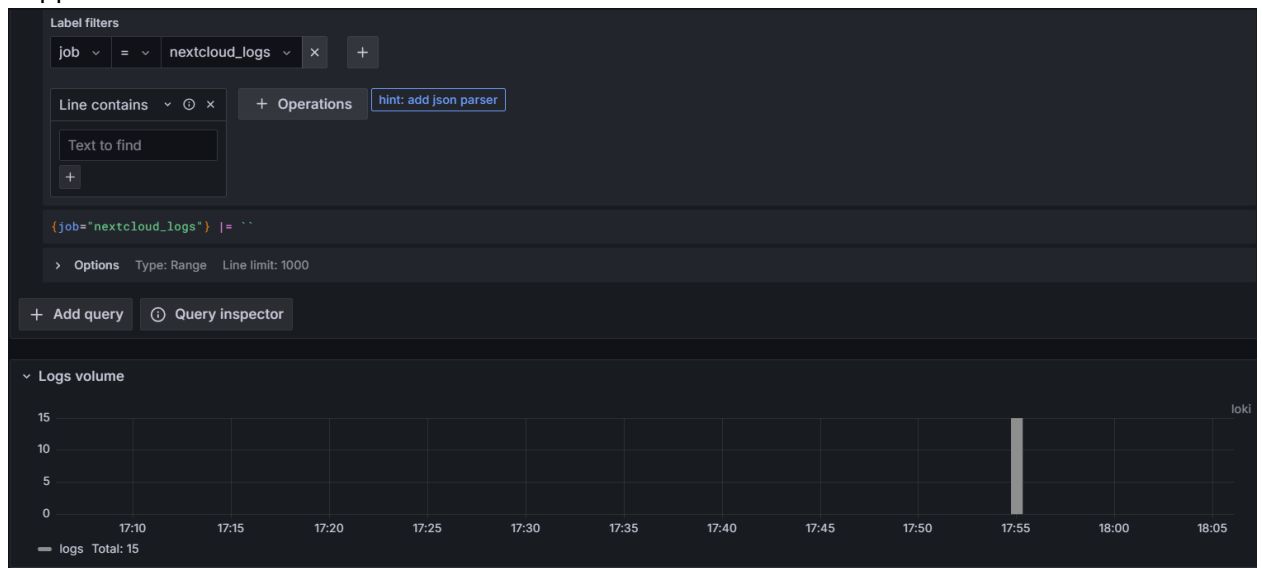
docker-compose down promtail

docker-compose up -d promtail

docker-compose logs promtail

curl "<http://localhost:3100/loki/api/v1/labels>"

Далее для корректной работы всех подключений было необходимо немного подождать (Loki/Promtail работают асинхронно), после чего логи в графана стали отображаться корректно:



TimeUnique labelsWrap linesPrettify JSONDeduplicationNoneExactNumbersSignature

Display resultsNewest firstOldest first

Common labels: job=nextcloud_logsLine limit: 1000 (15 displayed)Total bytes processed: 6.25 kBDownload

> 2026-01-10 17:54:05.826 {"reqId":"qCwriuqNjJIgCIdFAGsR","level":2,"time":"2026-01-08T16:14:52+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"POST","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

> 2026-01-10 17:54:05.826 {"reqId":"qCwriuqNjJIgCIdFAGsR","level":2,"time":"2026-01-08T16:14:52+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"POST","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

> 2026-01-10 17:54:05.826 {"reqId":"qClhiNSxEu00hQVnv1PS","level":2,"time":"2026-01-08T16:14:50+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

> 2026-01-10 17:54:05.826 {"reqId":"qClhiNSxEu00hQVnv1PS","level":2,"time":"2026-01-08T16:14:50+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

> 2026-01-10 17:54:05.826 {"reqId":"JTpo93spy0NFZ8IRoRym","level":2,"time":"2026-01-08T16:14:04+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/index.php","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

> 2026-01-10 17:54:05.826 {"reqId":"JTpo93spy0NFZ8IRoRym","level":2,"time":"2026-01-08T16:14:04+00:00","remoteAddr":"172.22.0.1","user":"","app":"no app in context","method":"GET","url":"/index.php","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36","version":"","data":{}}

Логг Zabbix

Outlinemy-zabbix-datasourceSplitAdd

QueriesTable

Query typeText

GroupApplicationsHostNextcloud

ApplicationItemNextcloud: ping service

Text filterUse capture groups

Options

Add queryQuery historyQuery inspector

Table - Nextcloud: ping service

Time	Nextcloud: ping service
2025-12-29 23:58:03	healthy
2025-12-30 00:15:15	healthy
2025-12-30 00:15:31	healthy
2025-12-30 00:16:31	healthy
2025-12-30 00:17:31	healthy
2025-12-30 00:18:31	healthy

Outlinealexanderzobnin-zabbix-dataSplitAddLast 1 hourRun query

Query typeText

GroupApplicationsHostNextcloud App

ApplicationItemNextcloud: ping service

Text filterUse capture groups

Options

Add queryQuery inspector

Table - Nextcloud: ping service

Time	Nextcloud: ping service
2026-01-08 19:24:31	healthy
2026-01-08 19:25:31	healthy
2026-01-08 19:26:31	healthy
2026-01-08 19:27:31	healthy
2026-01-08 19:28:31	healthy
2026-01-08 19:29:31	healthy

Задание

1. Сделаем несколько разных запросов

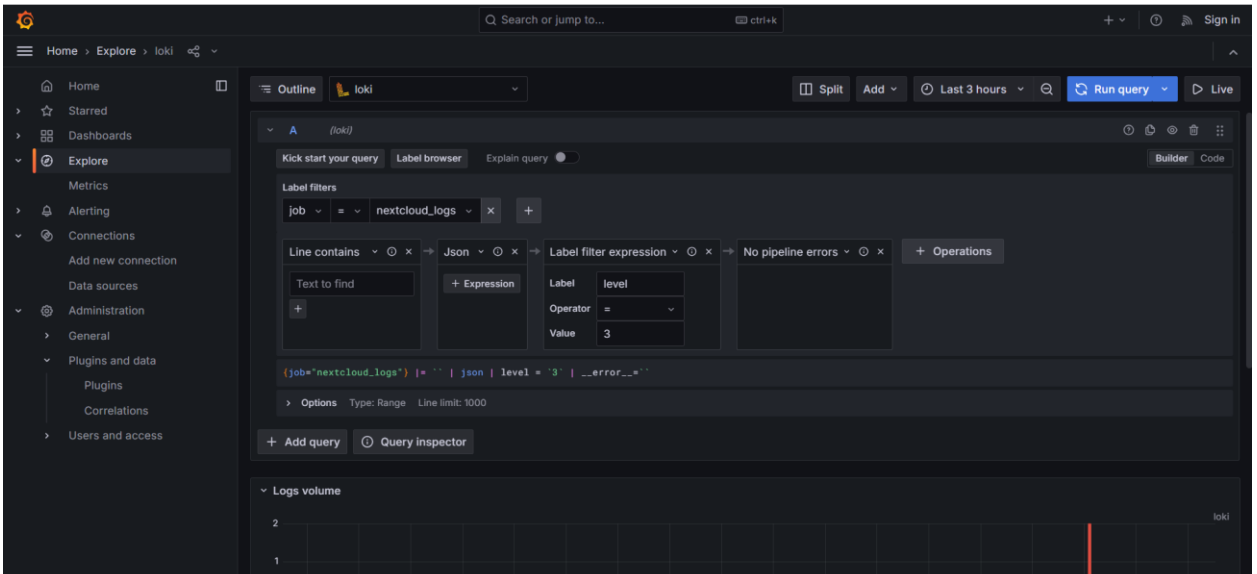
Укажем поиск по конкретному слову в логах

The screenshot shows the Loki query interface. At the top, there's a search bar with 'loki' and a dropdown menu. Below it, there's a 'Label filters' section with a filter for 'job' set to 'nextcloud_logs'. In the 'Line contains' section, the word 'local' is entered. The query editor shows the query: `{job="nextcloud_logs"} |> 'local'`. Below the query editor, there's a 'Logs volume' section showing a bar chart with a peak at 10. The interface also includes buttons for 'Run query', 'Live', 'Split', 'Add', and 'Query inspector'.

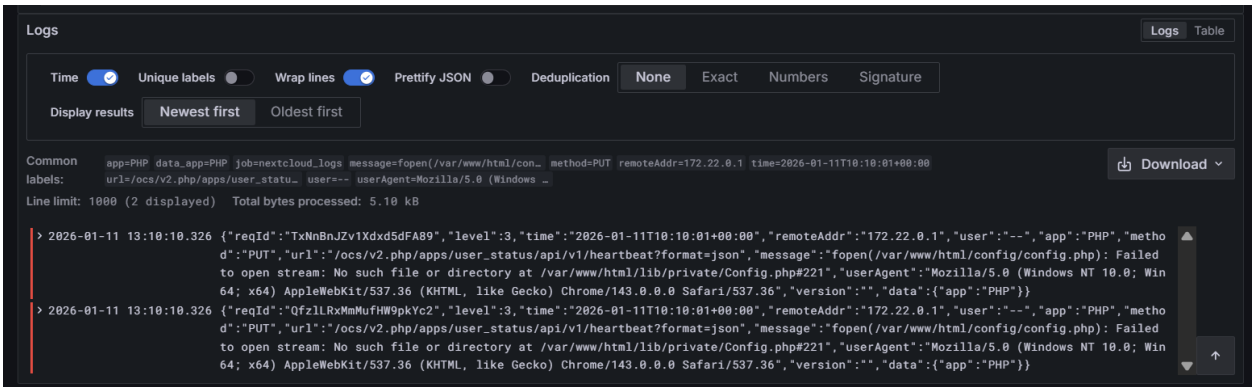
Найдены интересующие логи

The screenshot shows the Loki query interface with the results of a query for 'local'. The 'Display results' section is set to 'Newest first'. The results are displayed as a list of log entries. Each entry includes a timestamp, a log level, and a message. The messages are: 'Host localhost was not connected to because it violates local access rules'. The interface also includes buttons for 'Time', 'Unique labels', 'Wrap lines', 'Prettify JSON', 'Deduplication', and 'Download'.

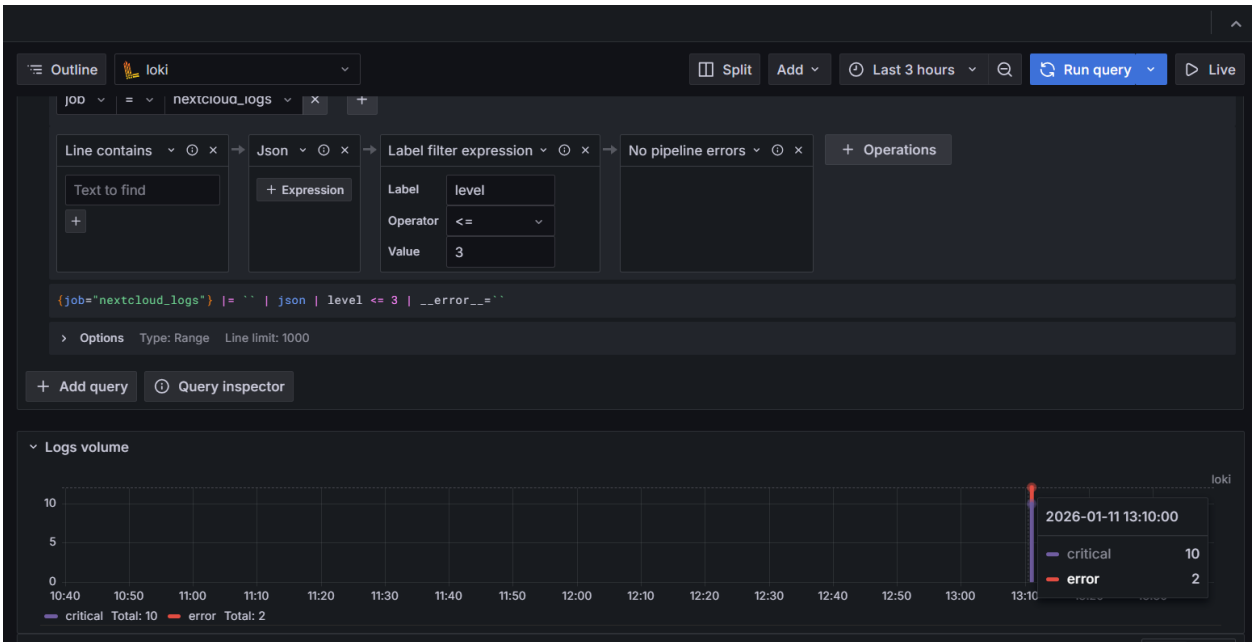
При помощи встроенного языка LogQL сконструируем запрос для просмотра ошибок в логах (ошибки обозначаются кодом 3):

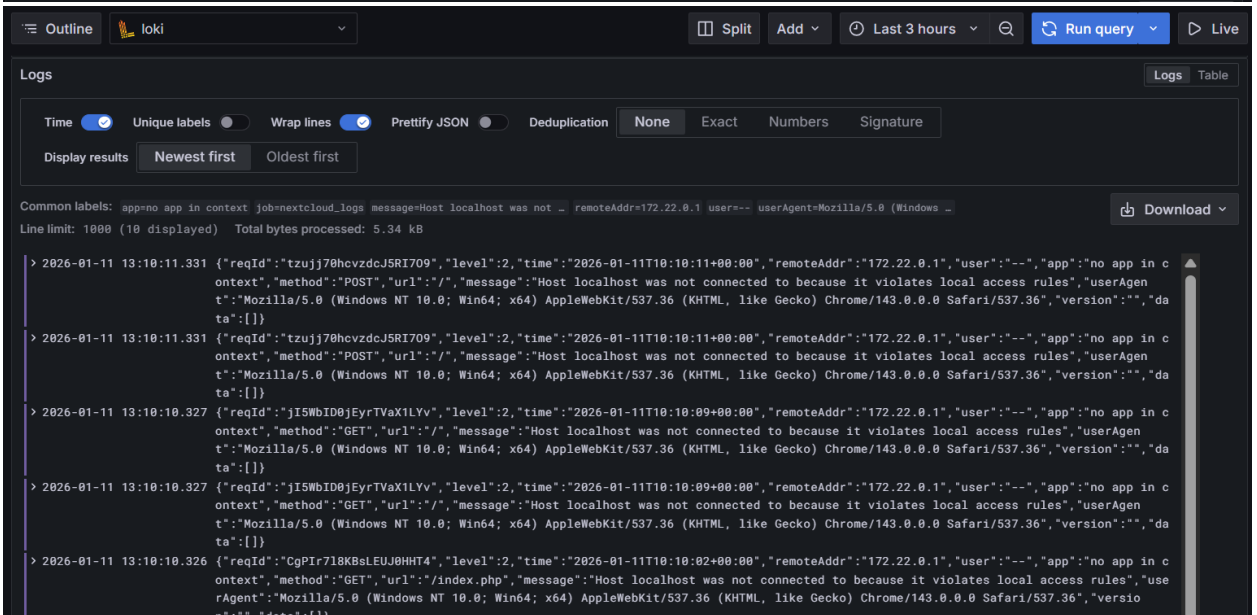
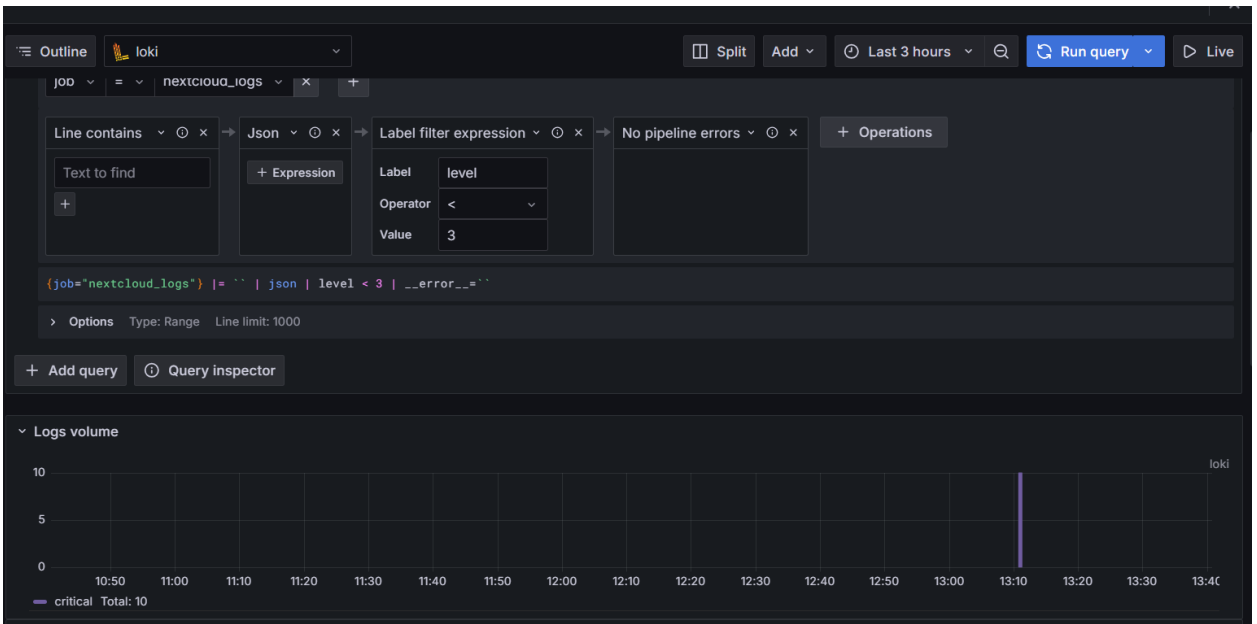


Получим в результате два лога с сообщением об ошибках:

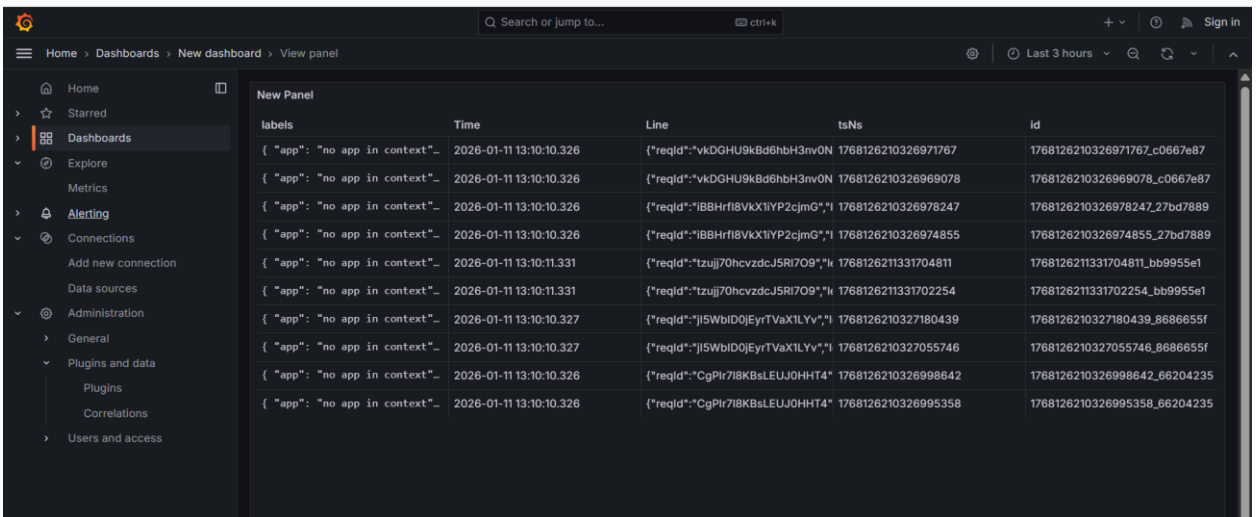


Посмотрим остальные сообщения:



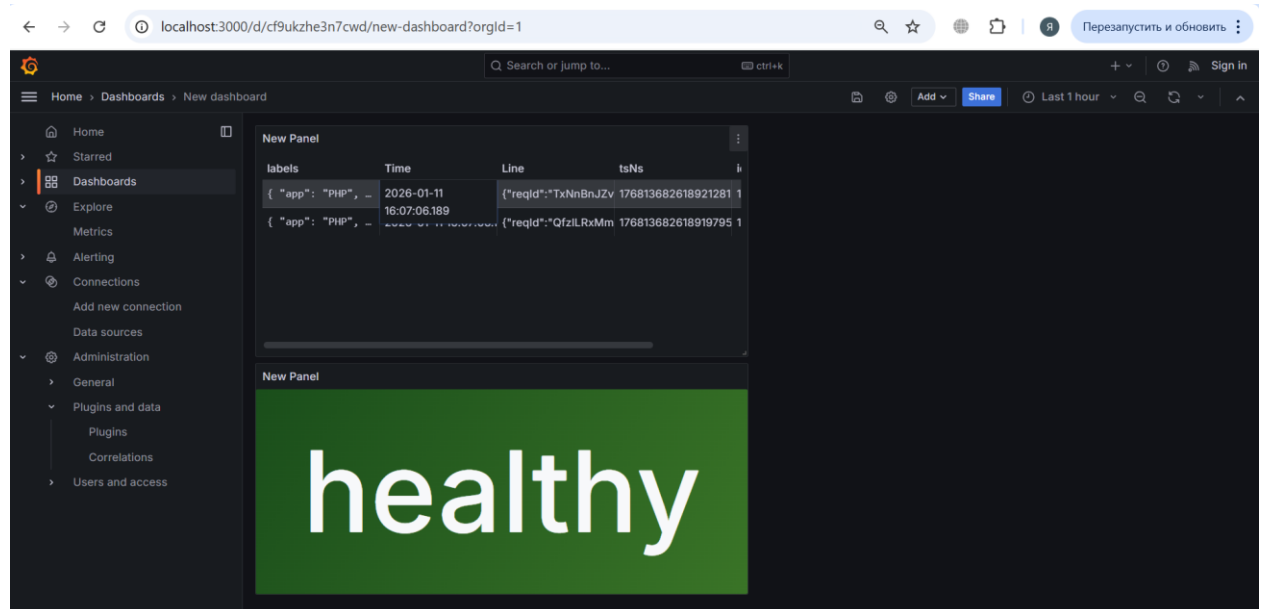


2. На основе данного запроса создадим дашборд
Вид “table”



Аналогично для Zabbix на основе запроса был добавлен дашборд. В настройках отображения был выбран вид stat, затем изменено значение по дефолту на Nextcloud: ping service, установлены значения для mapping на отображения цвета фона дашборда: зеленый – healthy, красный – unhealthy.

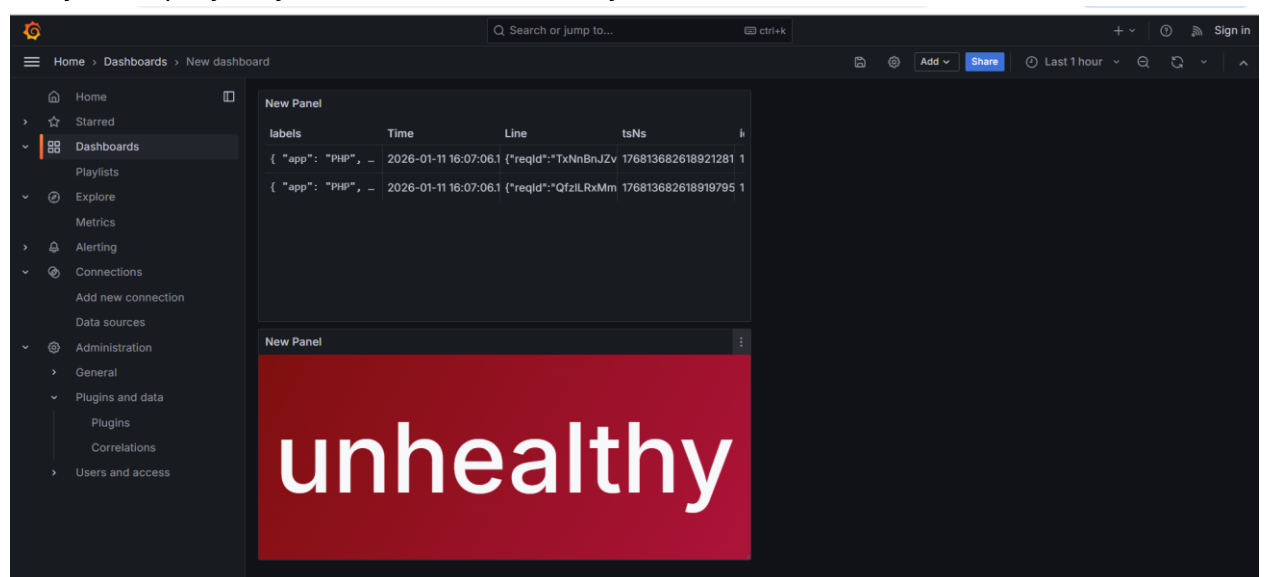
Итоговый вид дашбордов: сначала в виде таблицы выводятся логи со статусами ошибок, затем показан при помощи цвета статус healthy.



Включим maintenance mode:

```
docker exec -u www-data nextcloud php occ maintenance:mode --on
```

Получаем сразу визуальное обновление статуса:



Вопросы

1. Чем SLO отличается от SLA?

SLA (Service Level Agreement) – это договор между поставщиком сервиса и пользователем о том, какие условия для данного сервиса гарантируются.

SLO (Service Level Objective) – это внутренние условия, которые вы, как разработчики сервиса ставите, чтобы выполнять **SLA**. Устанавливается некий показатель, по которому можно будет считать, что сервис работает исправно, именно этот показатель мониторит Zabbix и визуализируется в Grafana.

2. Чем отличается инкрементальный бэкап от дифференциального?

Оба типа бэкапов создают резервные копии изменённых данных. Основные отличия: инкрементальный всегда сохраняет изменения от последней резервной версии (не важно полная она или инкрементальная), а дифференциальный хранит все изменения с момента последнего полного бэкапа. Соответственно, для первого варианта необходимо меньше места, однако в случае восстановления нужно будет потратить время на восстановление данных, чтобы добавить к последней резервной версии всю последовательность изменений. Для дифференциального при восстановлении данных можно взять только полную версию и последний бэкап.

3. В чем разница между мониторингом и observability?

Цель мониторинга заключается в отслеживании известных метрик для выявления проблем в системе. При этом используются заранее заданные триггеры, которые срабатывают при невыполнении определенных условий.

Observability – это подход, при котором целью является выявление причин проблемы. При этом используются детальные данные: логи, метрики, что помогает разобраться в существующей поломке.