

ЛР 2. Loki + Zabbix + Grafana

Задача

Подключить к тестовому сервису Nextcloud мониторинг + логирование. Осуществить визуализацию через Grafana

Часть 1. Логирование

1. Создаем файл docker-compose.yml, который содержит в себе тестовый сервис Nextcloud, Loki, Promtail, Grafana, Zabbix и Postgres для него по примеру из гайда:

```
services:  
nextcloud:  
    image: nextcloud:29.0.6  
    container_name: nextcloud  
    ports:  
        - "8080:80"  
    volumes:  
        - nc-data:/var/www/html/data  
  
loki:  
    image: grafana/loki:2.9.0  
    container_name: loki  
    ports:  
        - "3100:3100"  
    command: -config.file=/etc/loki/local-config.yaml  
  
promtail:  
    image: grafana/promtail:2.9.0  
    container_name: promtail  
    volumes:  
        - nc-data:/opt/nc_data  
        - ./promtail_config.yml:/etc/promtail/config.yaml  
    command: -config.file=/etc/promtail/config.yaml  
  
grafana:  
    image: grafana/grafana:11.2.0  
    container_name: grafana  
    environment:  
        - GF_PATHS_PROVISIONING=/etc/grafana/provisioning  
        - GF_AUTH_ANONYMOUS_ENABLED=true  
        - GF_AUTH_ANONYMOUS_ORG_ROLE=Admin  
    ports:  
        - "3000:3000"  
  
postgres-zabbix:  
    image: postgres:15  
    container_name: postgres-zabbix  
    environment:
```

```
POSTGRES_USER: zabbix
POSTGRES_PASSWORD: zabbix
POSTGRES_DB: zabbix
volumes:
- zabbix-db:/var/lib/postgresql/data

zabbix-server:
image: zabbix/zabbix-server-pgsql:ubuntu-6.4-latest
container_name: zabbix-back
ports:
- "10051:10051"
depends_on:
- postgres-zabbix
environment:
POSTGRES_USER: zabbix
POSTGRES_PASSWORD: zabbix
POSTGRES_DB: zabbix
DB_SERVER_HOST: postgres-zabbix

zabbix-web-nginx-pgsql:
image: zabbix/zabbix-web-nginx-pgsql:ubuntu-6.4-latest
container_name: zabbix-front
ports:
- "8082:8080"
depends_on:
- postgres-zabbix
environment:
POSTGRES_USER: zabbix
POSTGRES_PASSWORD: zabbix
POSTGRES_DB: zabbix
DB_SERVER_HOST: postgres-zabbix
ZBX_SERVER_HOST: zabbix-back

volumes:
nc-data:
zabbix-db:

2. Затем создаем promtail_config.yml в той же директории со следующим содержанием:
server:
http_listen_port: 9080
grpc_listen_port: 0

positions:
filename: /tmp/positions.yaml

clients:
- url: http://loki:3100/loki/api/v1/push
```

```

scrape_configs:
- job_name: system
  static_configs:
  - targets:
    - localhost
  labels:
    job: nextcloud_logs
    __path__: /opt/nc_data/*.log

```

3. И запускаем все сервисы в нашей директории:

```
(base) marina@MacBook-Pro-Marina lab2 % docker compose up -d

[+] Running 76/76
✓ loki Pulled                                         146.1s
✓ nextcloud Pulled                                     343.8s
✓ promtail Pulled                                     175.9s
✓ grafana Pulled                                      279.2s
✓ zabbix-web-nginx-pgsql Pulled                      293.0s
✓ postgres-zabbix Pulled                             287.1s
✓ zabbix-server Pulled                               250.2s
[+] Running 10/10
✓ Network lab2_default      Created                  0.1s
✓ Volume "lab2_nc-data"     Created                  0.0s
✓ Volume "lab2_zabbix-db"   Created                  0.0s
✓ Container postgres-zabbix Started                0.9s
✓ Container grafana        Started                0.8s
✓ Container nextcloud       Started                0.9s
✓ Container promtail       Started                0.9s
✓ Container loki           Started                0.9s
✓ Container zabbix-front  Started                0.7s
✓ Container zabbix-back   Started                0.7s

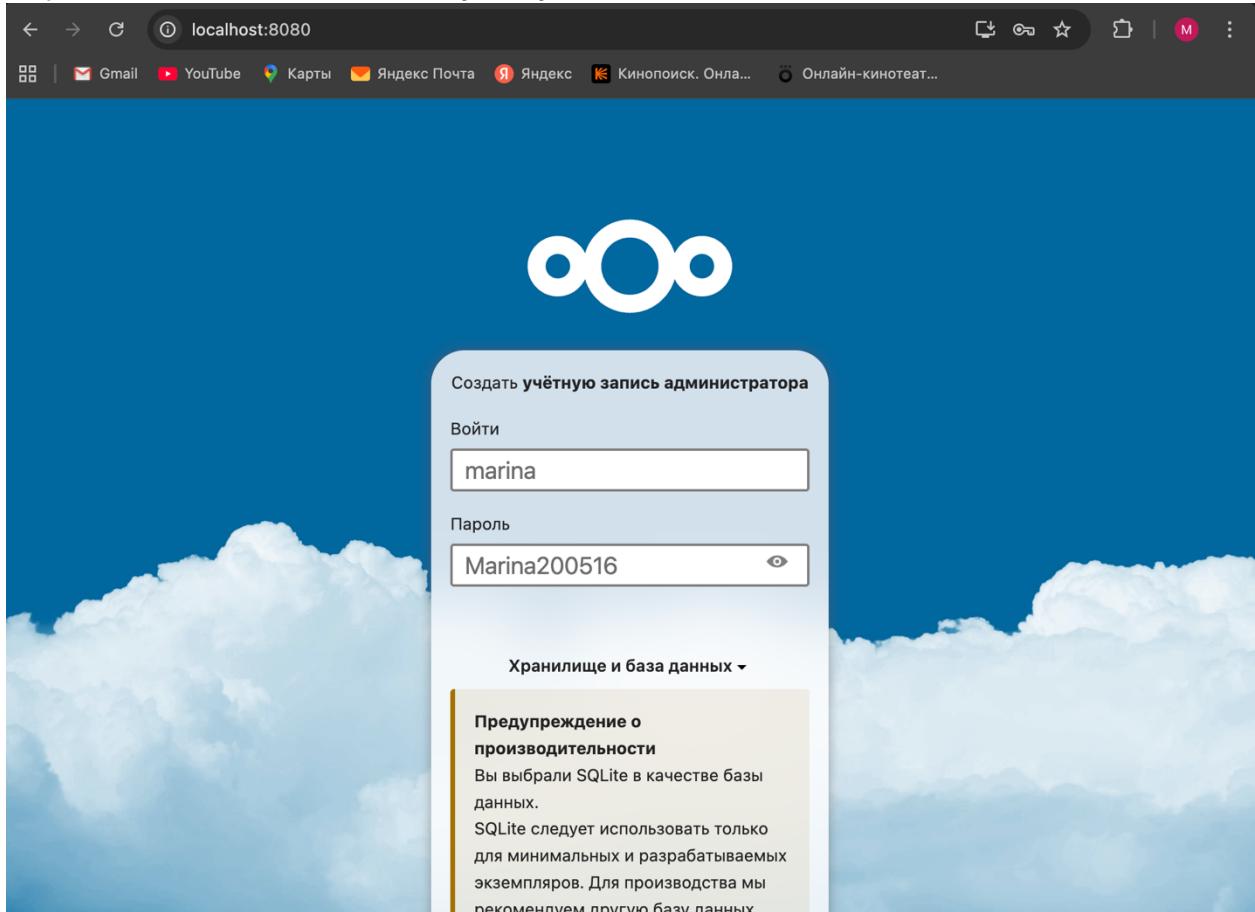
(base) marina@MacBook-Pro-Marina lab2 % docker ps

CONTAINER ID   IMAGE                                COMMAND          CREATED
           STATUS          PORTS          NAMES
35a22692480b   zabbix/zabbix-server-pgsql:ubuntu-6.4-latest   "/usr/bin/tini -- /u..."  7 second
s ago   Up 6 seconds          0.0.0.0:10051->10051/tcp  zabbix-back
58d063098791   zabbix/zabbix-web-nginx-pgsql:ubuntu-6.4-latest  "docker-entrypoint.sh"  7 second
s ago   Up 6 seconds (health: starting)  8443/tcp, 0.0.0.0:8082->8080/tcp  zabbix-front
5d296e7996b8   postgres:15                            "docker-entrypoint.s..."  7 second
s ago   Up 6 seconds          5432/tcp          postgres-zabbix
21a1c663d6ac   nextcloud:29.0.6                     "/entrypoint.sh apac..."  7 second
s ago   Up 6 seconds          0.0.0.0:8080->80/tcp  nextcloud
551b533b1ab5   grafana/grafana:11.2.0               "/run.sh"            7 second
s ago   Up 6 seconds          0.0.0.0:3000->3000/tcp  grafana
a1c97b9cb05d   grafana/promtail:2.9.0                "/usr/bin/promtail -..."  7 second
s ago   Up 6 seconds          0.0.0.0:3100->3100/tcp  promtail
e1bd26f4df11   grafana/loki:2.9.0                  "/usr/bin/loki -conf..."  7 second
s ago   Up 6 seconds          0.0.0.0:3100->3100/tcp  loki

```

```
(base) marina@MacBook-Pro-Marina lab2 % ls -la
total 16
drwxr-xr-x@ 4 marina  staff   128 Dec 24 00:12 .
drwxr-xr-x@ 47 marina  staff  1504 Dec 24 00:10 ..
-rw-r--r--@ 1 marina  staff  1747 Dec 24 00:11 docker-compose.yml
-rw-r--r--@ 1 marina  staff   310 Dec 24 00:12 promtail_config.yml
```

4. Инициализация Nextcloud. Для этого открываем в браузере:
<http://localhost:8080> и создаем учетку:



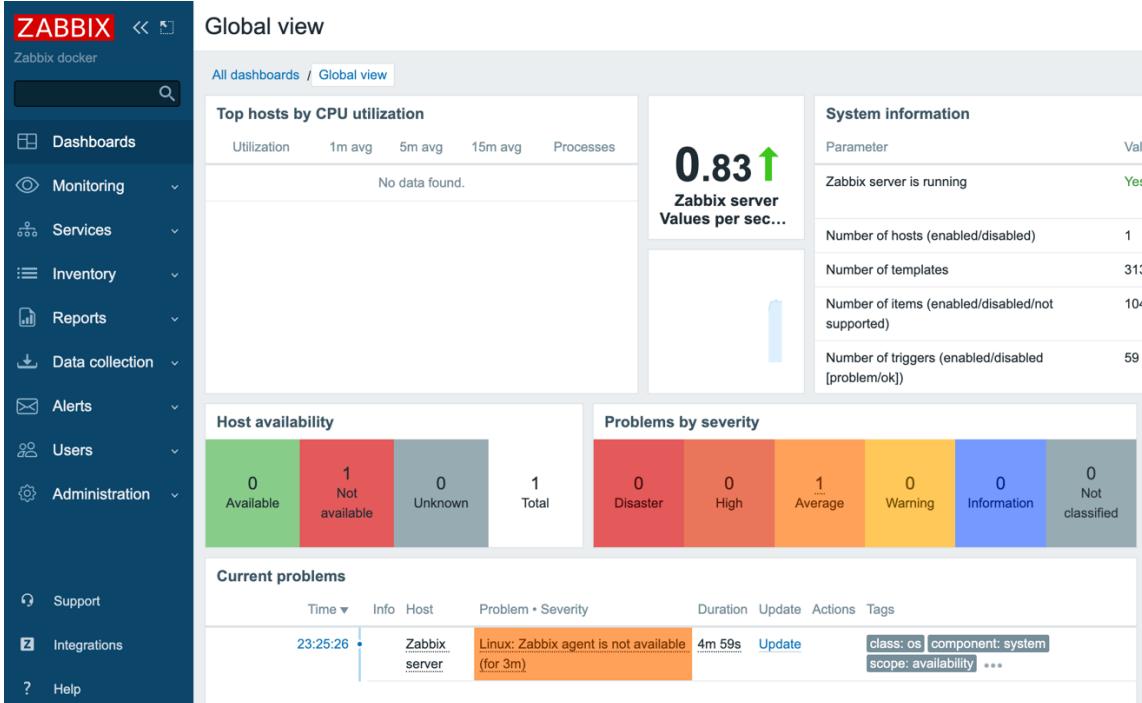
5. Далее проверяем, что логи собираются. Для этого ищем строку типа Seaked /opt/nc_data/nextcloud.log (на моем скрине она в самом низу):

```
(base) marina@MacBook-Pro-Marina lab2 % docker logs promtail

level=info ts=2025-12-23T21:21:25.309948055Z caller=promtail.go:133 msg="Reloading configuration file" md5sum=2c8ba9ad5647669e9f64bdad5fed7eae
level=info ts=2025-12-23T21:21:25.31156868Z caller=server.go:322 http=[::]:9080 grpc=[::]:40975 msg="server listening on addresses"
level=info ts=2025-12-23T21:21:25.31194568Z caller=main.go:174 msg="Starting Promtail" version="(version=2.9.0, branch=HEAD, revision=2feb64f69)"
level=warn ts=2025-12-23T21:21:25.31237593Z caller=promtail.go:263 msg="enable watchConfig"
level=info ts=2025-12-23T21:21:30.316224543Z caller=filetargetmanager.go:361 msg="Adding target" key="/opt/nc_data/*.log:{job=\"nextcloud_logs\"}"
level=info ts=2025-12-23T21:24:30.319506126Z caller=filetarget.go:313 msg="watching new directory" directory=/opt/nc_data
level=info ts=2025-12-23T21:24:30.320293085Z caller=tailer.go:145 component=tailer msg="tail routine: started" path=/opt/nc_data/nextcloud.log
ts=2025-12-23T21:24:30.320487918Z caller=log.go:168 level=info msg="Seeked /opt/nc_data/nextcloud.log - &{Offset:0 Whence:0}"
```

Часть 2. Мониторинг

1. Открываем в браузере: <http://localhost:8082> (логин: Admin, пароль: zabbix):



2. Создаем шаблон мониторинга template.yml (также по гайду):

```
zabbix_export:
  version: '6.4'
  template_groups:
    - uuid: a571c0d144b14fd4a87a9d9b2aa9fc6
      name: Templates/Applications
  templates:
    - uuid: a615dc391a474a9fb24bee9f0ae57e9e
      template: 'Test ping template'
      name: 'Test ping template'
  groups:
```

```

- name: Templates/Applications
items:
- uuid: a987740f59d54b57a9201f2bc2dae8dc
  name: 'Nextcloud: ping service'
  type: HTTP_AGENT
  key: nextcloud.ping
  value_type: TEXT
  trends: '0'
preprocessing:
- type: JSONPATH
  parameters:
  - $.body.maintenance
- type: STR_REPLACE
  parameters:
  - 'false'
  - healthy
- type: STR_REPLACE
  parameters:
  - 'true'
  - unhealthy
url: 'http://{{HOST.HOST}}/status.php'
output_format: JSON
triggers:
- uuid: a904f3e66ca042a3a455bcf1c2fc5c8e
  expression: 'last(/Test ping template/nextcloud.ping)="unhealthy"'
  recovery_mode: RECOVERY_EXPRESSION
  recovery_expression: 'last(/Test ping template/nextcloud.ping)="healthy"'
  name: 'Nextcloud is in maintenance mode'
  priority: DISASTER

```

Импортируем полученный файл в Zabbix:

Name	Hosts	Items	Triggers	Graphs	Dashboards	Discovery	Web	Vendor	Version	Linked templates
Acronis Cyber Protect Cloud by HTTP	Hosts 1	Items 1	Triggers	Graphs	Dashboards	Discovery 1	Web	Zabbix	6.4-0	
Acronis Cyber Protect Cloud MSP by HTTP	Hosts 1	Items 9	Triggers	Graphs 1	Dashboards 1	Discovery 3	Web	Zabbix	6.4-0	
AIX by Zabbix agent	Hosts 44	Items 44	Triggers 10	Graphs 4	Dashboards 2	Discovery 2	Web	Zabbix	6.4-0	
Alcatel Timetra TiMOS by SNMP	Hosts 19	Items 19	Triggers 9	Graphs 3	Dashboards 1	Discovery 6	Web	Zabbix	6.4-0	

3. Разрешаем имя nextcloud:

```
(base) marina@MacBook-Pro-Marina lab2 % docker exec -it nextcloud bash
root@21a1c663d6ac:/var/www/html# su -s /bin/bash www-data
www-data@21a1c663d6ac:~/html$ php occ config:system:set trusted_domains 1 --value="nextcloud"
System config value trusted_domains => 1 set to string nextcloud
```

4. Добавляем хост:

New host

	Host	IPMI	Tags	Macros	Inventory	Encryption	Value mapping
* Host name	nextcloud						
Visible name	nextcloud						
Templates	Test ping template X					Select	
Host groups	Applications X					Select	
Interfaces	No interfaces are defined.						
	Add						
Description							
Monitored by proxy	(no proxy)						
Enabled	<input checked="" type="checkbox"/>						

5. Теперь можно проверить мониторинг в Monitoring => Latest data. Там должно появиться значение healthy:

<input type="checkbox"/> nextcloud	Nextcloud: ping service	18s	healthy
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Часть 3. Визуализация

1. В терминале выполняем команды:

```
(base) marina@MacBook-Pro-Marina lab2 % 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/alexanderzobnin-zabbix-app

Please restart Grafana after installing or removing plugins. Refer to Grafana documentation for instructions if necessary.

(base) marina@MacBook-Pro-Marina lab2 % docker restart grafana
grafana
```

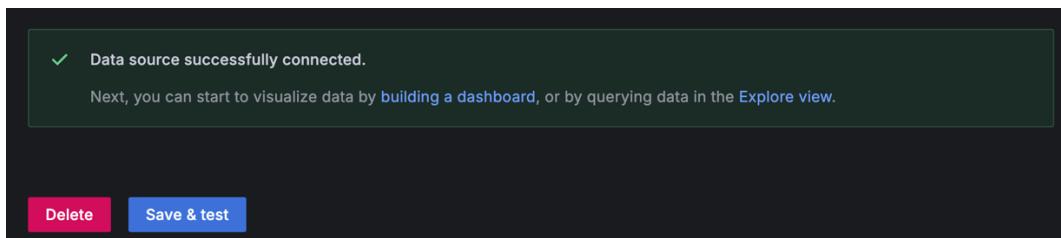
2. Заходим в Grafana (<http://localhost:3000/>) и активируем Zabbix:

The screenshot shows the Grafana plugin store interface. At the top, there's a search bar and navigation links for Home, Administration, Plugins and data, Plugins, and Zabbix. Below the header, the Zabbix plugin card is displayed. It includes the Zabbix logo, the name "Zabbix", its version (6.0.3), developer (Grafana Labs), dependencies (Grafana >= 11.6.0), and a "Signed" status. Buttons for "Uninstall" and "Disable" are visible. A note below states "You do not have permission to uninstall this plugin." Below the card, there are tabs for "Overview" (which is selected) and "Version history". The main content area shows a dashboard preview titled "Readme example" featuring various metrics like CPU load, memory usage, and disk space.

3. Подключаем Loki к Grafana:

The screenshot shows the Grafana connections page. The URL is "Home > Connections > Data sources > loki". The Loki data source is listed with the type "Loki" and status "Supported". There are buttons for "Explore data" and "Build a dashboard". A modal window titled "Configure your Loki data source below" provides instructions to skip configuration or use the free forever Grafana Cloud plan. Below the modal, the "Settings" tab is selected. The "Name" field is set to "loki", and the "Default" toggle switch is turned on. A note at the bottom says: "Before you can use the Loki data source, you must configure it below or in the config file. For detailed instructions, [view the documentation](#)".

4. Видим, что ошибок нет:



5. То же самое с Zabbix:

A screenshot of the Grafana settings page for a Zabbix data source named "alexanderzobnin-zabbix-datasource". The page shows the following details:

- Type: Zabbix
- Alerting: Supported
- Explore data and Build a dashboard buttons are present.
- Settings tab is selected.
- Dashboard tab is also visible.
- Name input field: alexanderzobnin-zabbix-datasource
- Default toggle switch is off.
- Configuration section:
 - URL * (radio button selected): http://zabbix-front:8080/api_jsonrpc.php
 - Zabbix API version: 6.4.21 (green checkmark)
- Success message at the bottom: "Next, you can start to visualize data by [building a dashboard](#), or by querying data in the [Explore view](#)."

6. Переходим в Explore, выбираем в качестве селектора job, все остальные настройки брались из гайда тоже😊 Жмем Run query и видим свои логи:

The screenshot shows two stacked panels of the Loki UI. The top panel is the 'Explore' view, titled '(loki)'. It features a 'Label filters' section with a dropdown set to 'job' and a value of 'nextcloud_logs'. Below it is a 'Line contains' input field with a placeholder 'Text to find'. A query editor at the bottom contains the text: '{job="nextcloud_logs"} |= ``'. The bottom panel is the 'Logs volume' view, showing a histogram of log entries over time from 00:10 to 01:05. A single bar is visible at approximately 00:25 with a height of 3. Below the histogram, a 'Logs' table view is shown with the following configuration: 'Time' checked, 'Unique labels' unchecked, 'Wrap lines' checked, 'Prettify JSON' unchecked. The 'Deduplication' tab is selected, showing 'None' as the option. The 'Display results' tab is selected, showing 'Newest' as the option, with a tooltip explaining 'De-duplication of successive lines that have identical punctuation and whitespace.' At the bottom of the logs table, there is a 'Download' button and some summary statistics: 'Common labels: job=nextcloud_logs', 'Line limit: 1000 (5 displayed)', and 'Total bytes processed: 2.21 kB'. The logs themselves are listed as follows:

```
> 2025-12-24 00:25:20.812 {"reqId":"ySxTEa1nQFyiUEdpYfxp","level":2,"time":"2025-12-23T21:25:20+00:00","remoteAddr":"192.168.65.1","user":"--","app":"no app in context","method":"POST","uri":"/","message":"Host localhost was not connected to because it violates local access rules","userAgent":"Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/103.0.5060.134 Safari/537.36"}<
```

7. То же самое делаю с Zabbix:

The screenshot shows a Zabbix interface with a dark theme. At the top, there's a header bar with a dropdown menu, a search bar containing '(alexanderzobnin-zabbix-datasource)', and several icons for file operations. Below the header is a configuration panel for a query named 'A'. The 'Query type' is set to 'Text', and the 'Group' is 'Applications'. Under 'Host', it shows 'nextcloud'. Under 'Item', it shows 'Nextcloud: ping service'. A 'Text filter' field is empty. There's a toggle switch for 'Use capture groups' which is off. Below the configuration is a 'Options' section with a 'Query inspector' button. At the bottom of the configuration panel are 'Add query' and 'Query inspector' buttons.

Table - Nextcloud: ping service

Time	Nextcloud: ping service
2025-12-24 00:49:31	healthy
2025-12-24 00:50:31	healthy
2025-12-24 00:51:31	healthy
2025-12-24 00:52:31	healthy
2025-12-24 00:53:31	healthy
2025-12-24 00:54:31	healthy

Задание

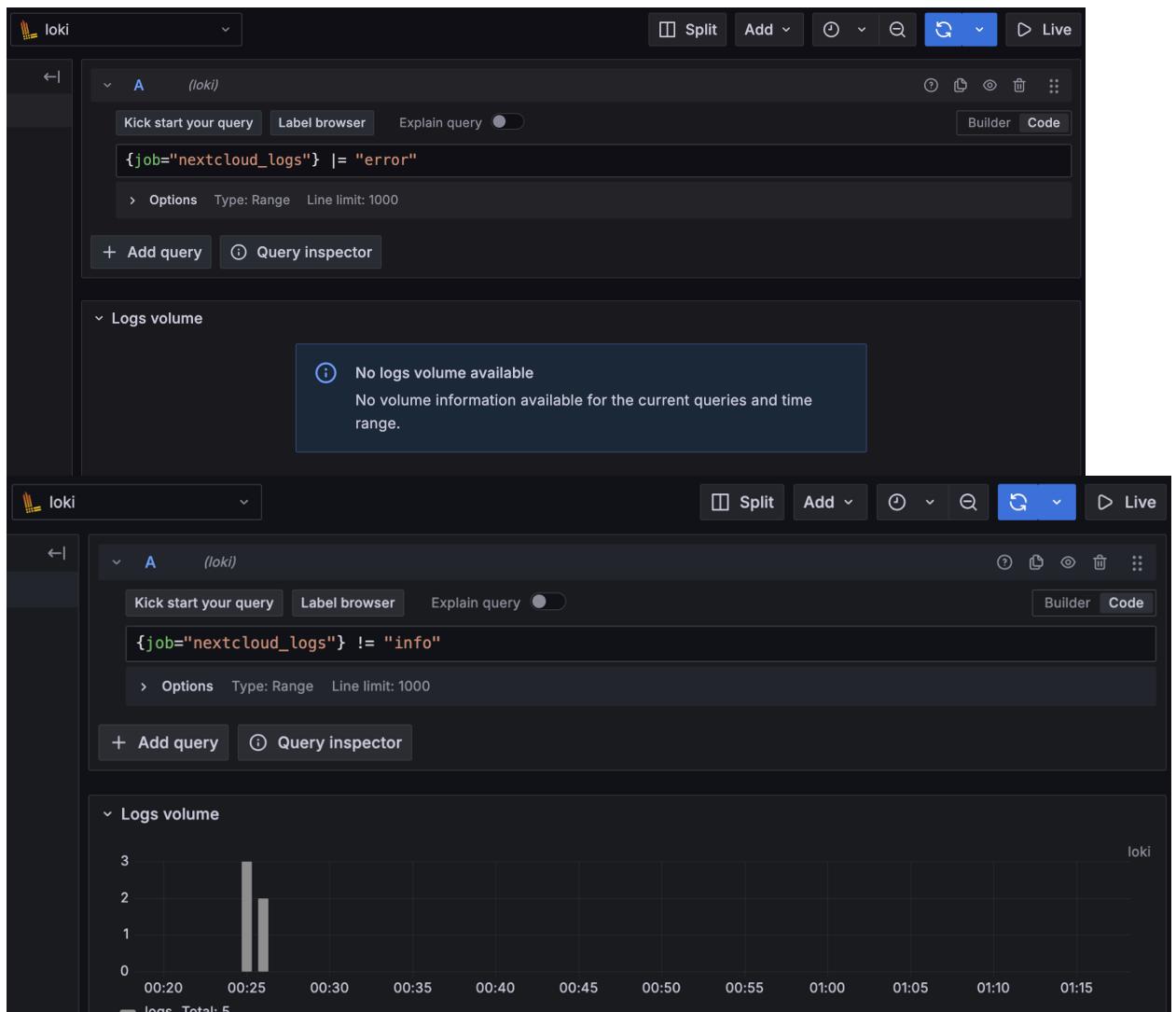
- Попробуем посмотреть, как меняется вывод в зависимости от запроса.

Loki

The screenshot shows the Loki interface with a dark theme. At the top, there's a header bar with a logo, a dropdown menu, and several icons for file operations. Below the header is a configuration panel for a query named 'A'. The query is set to 'loki'. The main input field contains the query: '{job="nextcloud_logs"} |= "login"'. Below the input field are 'Options', 'Type: Range', and 'Line limit: 1000' buttons. At the bottom of the configuration panel are 'Add query' and 'Query inspector' buttons.

Logs volume

No logs volume available
No volume information available for the current queries and time range.



Zabbix

The figure shows the Zabbix interface with the following configuration:

- Query type:** Triggers
- Count by:** All triggers
- Group:** Applications
- Host:** nextcloud
- Tags:** tag1:value1, tag2:value2
- Min severity:** Not classified
- Count:** (checkbox is checked)

Table - Triggers A

Host group	Disaster	High	Average	Warning	Information
Applications	0	0	0	0	0

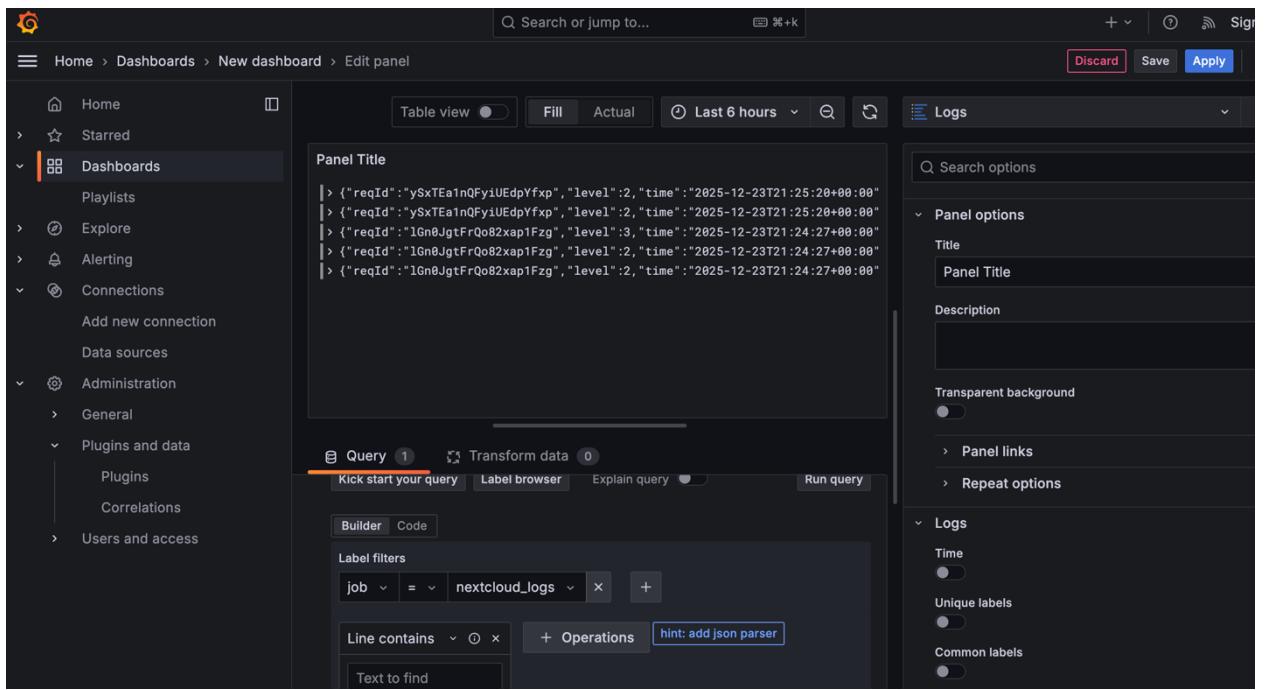
The screenshot shows the Grafana Query editor interface. At the top, there is a header with the text '(alexanderzobnin-zabbix-datasource)'. Below it, a 'Query type' dropdown is set to 'Problems', which is highlighted with a blue border. To the right of the dropdown are buttons for 'Group' (set to 'Applications'), 'Host' (set to 'nextcloud'), and 'Proxy'. Further down, there are fields for 'Problem name' (empty), 'Tags' (set to 'tag1:value1, tag2:value2'), and an 'AND/OR' dropdown (set to 'AND'). Below these are buttons for 'Show' (set to 'Problems'), 'Severity' (empty), and 'Show all problems' (dropdown). A link to 'Options' is also present. At the bottom left are buttons for '+ Add query' and 'Query inspector'. The main area is titled 'Table' and displays the message '0 series returned'.

2. Создание дашбордов

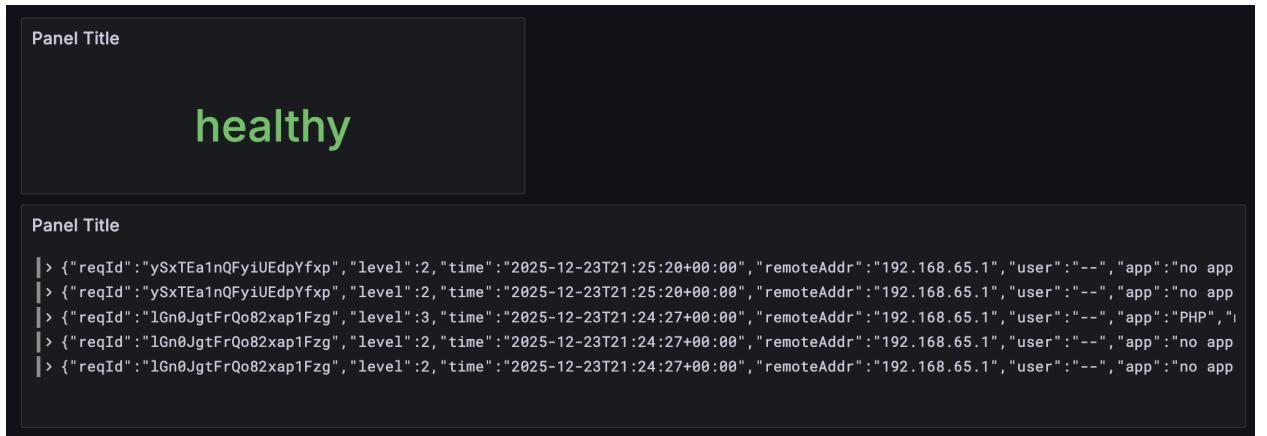
Здесь также по примеру из гайда были созданы два дашборда, один показывает состояние nextcloud (healthy или unhealthy). Для этого создаем новый дашборд, в Value options выбираем отображение последнего ненулевого значения в поле Nextcloud: ping service. Цвета и сам текст я решила оставить без изменений, чтобы точно понимать откуда пришло значение:

The screenshot shows the Grafana dashboard editor. On the left, a sidebar navigation includes 'Home', 'Dashboards' (selected), 'Playlists', 'Explore', 'Alerting', 'Connections' (with 'Add new connection' and 'Data sources' sub-options), 'Administration' (with 'General', 'Plugins and data' (selected), 'Correlations', and 'Users and access' sub-options), and 'Starred'. The main area shows a panel titled 'Panel Title' containing the word 'healthy' in large green letters. Below the title are 'Table view' and 'Actual' buttons, a time range selector ('Last 6 hours'), and a search bar ('Q Search options'). On the right, a panel configuration sidebar shows 'Value options' (selected), 'Show' (calculated value per column or series), 'Calculation' (set to 'Last *'), and 'Fields' (set to 'Nextcloud: ping service'). Buttons for 'Discard', 'Save', and 'Apply' are at the top right.

И второе поле было создано для отображения логов из Loki. Здесь я просто в панели Query настроила все те же значения, что и выполнялись ранее в лабе:



И вот такой итоговый вид у наших панелей получился, с отображением состояния и самих логов:



Ответы на вопросы

Чем SLO отличается от SLA?

SLA (Service Level Agreement) – это формальное соглашение между поставщиком и клиентом, которое определяет гарантированный уровень сервиса и ответственность сторон.

SLO (Service Level Objective) – это внутренняя цель по уровню качества сервиса, которая используется для мониторинга и улучшения системы и не обязательно закрепляется юридически.

Чем отличается инкрементальный бэкап от дифференциального?

Инкрементальный бэкап сохраняет только изменения с момента последнего бэкапа (полного или инкрементального).

Дифференциальный бэкап сохраняет все изменения с момента последнего полного бэкапа.

В чем разница между мониторингом и observability?

Мониторинг предназначен для отслеживания заранее известных метрик и состояний системы.

Observability – более широкое понятие, которое позволяет анализировать внутреннее состояние системы на основе метрик, логов и трассировок, включая поиск неизвестных ранее проблем.