ZABBIX

Browser Monitoring in Zabbix 7.0

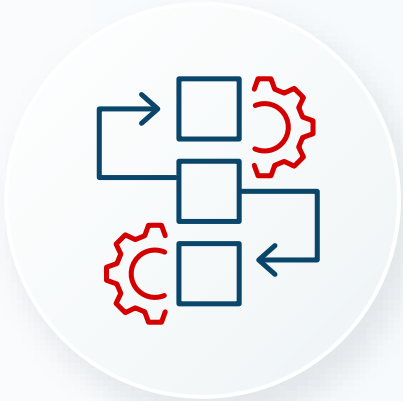
Kaspars Mednis

Training project manager

Website monitoring requirements

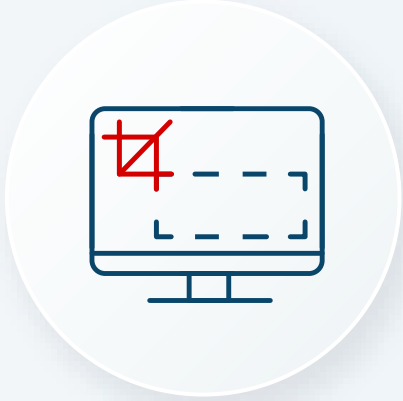
- Regular Testing: Perform regular tests to ensure continuous monitoring
- Automation: Automate monitoring tasks to reduce manual effort
- Charts and Graphs: Visual representations of monitoring data and trends.
- Screenshots: Visual examples of issues

Testing



Automation

Graphs



Screenshots

Synthetic web monitoring

ZABBIX

Synthetic Monitoring involves simulating user interactions with a website using automated scripts to test performance and functionality

Key Characteristics:

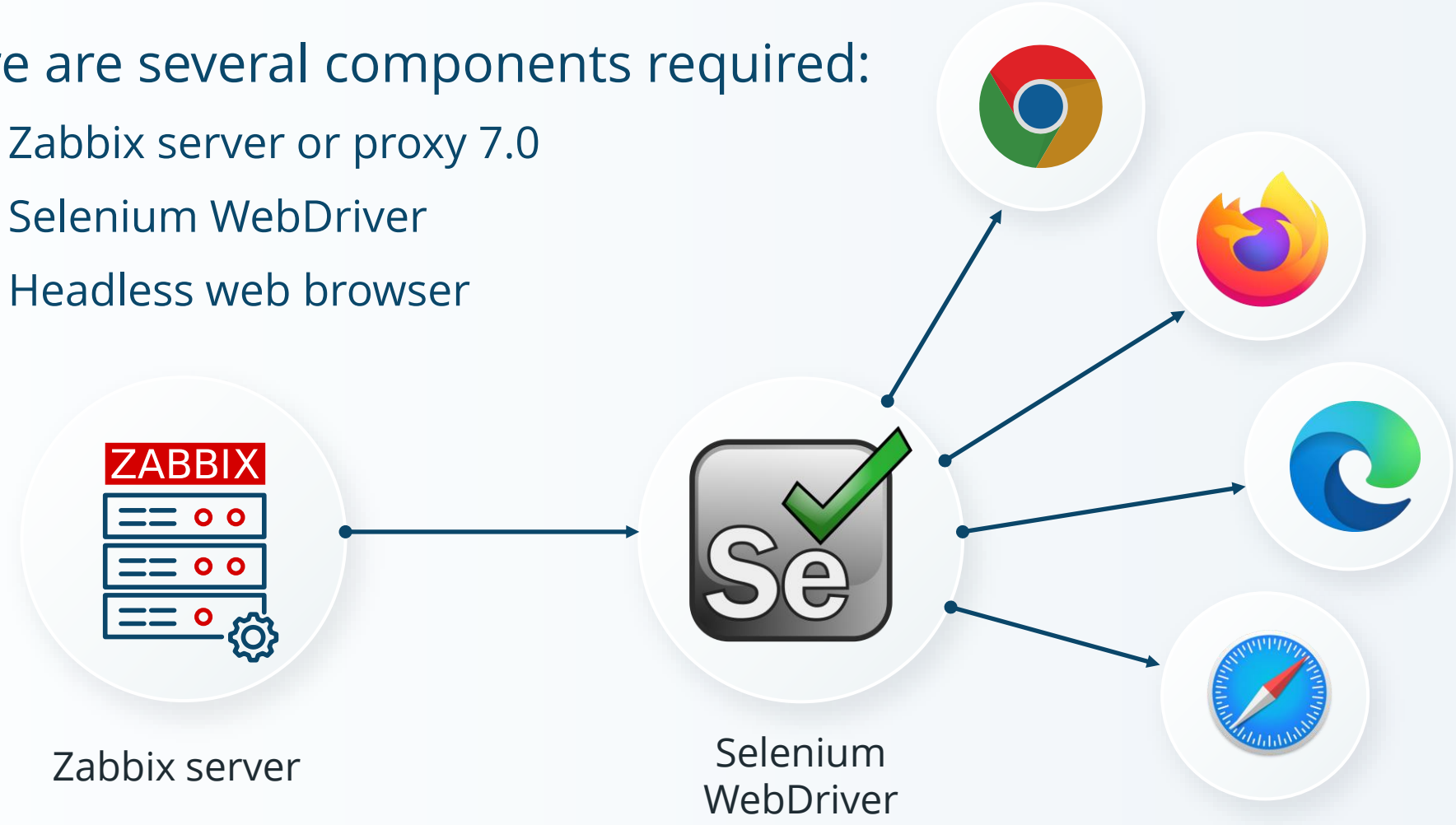
- Proactive Testing: Performed regularly, even if there are no real users on the site.
- Scenario-Based Testing: Can test specific scenarios, such as login processes, form submissions, or transaction flows.
- Baselines and Benchmarks: Helps in establishing performance baselines and benchmarks for comparison over time.

Monitoring Environment Setup

Monitoring requirements

There are several components required:

- Zabbix server or proxy 7.0
- Selenium WebDriver
- Headless web browser



Zabbix server configuration

```
####### Browser monitoring #######

### Option: WebDriverURL
#       WebDriver interface HTTP[S] URL. For example http://localhost:4444 used with
#       Selenium WebDriver standalone server.
#
# Mandatory: no
# Default:
# WebDriverURL=
WebDriverURL=http://192.168.0.1:4444

### Option: StartBrowserPollers
#       Number of pre-forked instances of browser item pollers.
#
# Mandatory: no
# Range: 0-1000
# Default:
# StartBrowserPollers=1
StartBrowserPollers=3
```

Example setup with containers

```
[Unit]
Description=Zabbix Server

[Container]
ContainerName=zabbix-server
Image=docker.io/zabbix/zabbix-server-mysql:alpine-trunk
Network=training.network
PublishPort=10051:10051
Environment=DB_SERVER_HOST=mysqldb.ex
...
Environment=ZBX_WEBDRIVERURL=http://s
Environment=ZBX_STARTBROWSERPOLLERS=3

[Service]
Restart=always

[Install]
WantedBy=default.target
```

```
[Unit]
Description=Selenium with chrome

[Container]
ContainerName=selenium
Image=docker.io/selenium/standalone-chrome:latest
Network=training.network
PublishPort=4444:4444

[Service]
Restart=always

[Install]
WantedBy=default.target
```

The Browser item

Browser item

Zabbix 7.0 introduces new item type: Browser

New item

Item Tags Preprocessing

* Name: Zabbix website

Type: Browser

* Key: website.get.data

Type of information: Text

Parameters: Name Value

Add

* Script: var browser = new Browser(Brows

* Update interval: 1m

JavaScript

```
1 var browser = new Browser(Browser.chromeOptions());
2
3 try {
4         browser.navigate("http://example.com");
5         browser.collectPerfEntries();
6 }
7 finally {
8         return JSON.stringify(browser.getResult());
9 }
```

65346 characters remaining

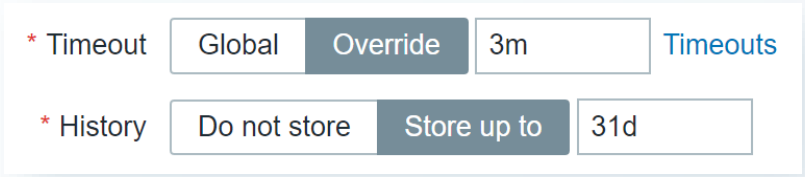
Apply Cancel

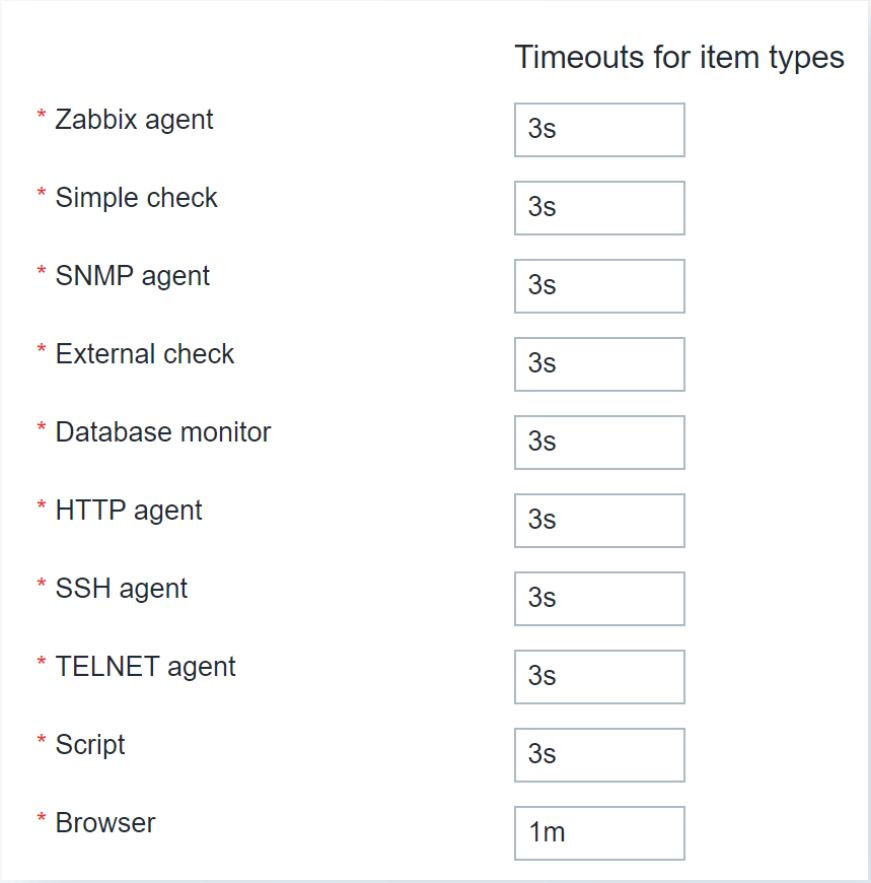
Browser item timeout

Data collection timeout can be specified for the browser item:

- On the Zabbix server level
- On the Zabbix proxy level
- On the individual item level

Item override





Browser item output

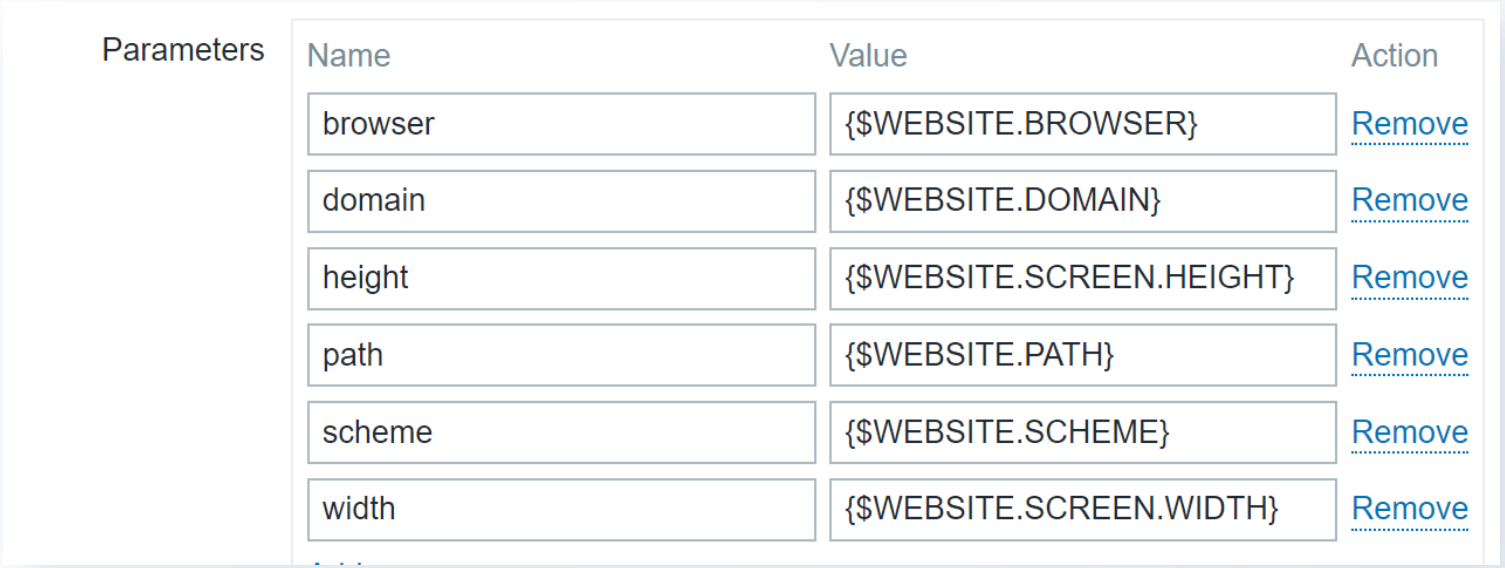
The browser item collects all performance metrics in the JSON format


```
{
   "duration": 5.4627423286438,
   "performance_data": {
      "details": [
         {
            "navigation": {
               "activation_start": 0,
               "connect_end": 0.0639000000059605,
               "connect_start": 0.022,
               "critical_ch_restart": 0,
               "decoded_body_size": 202169,
               "delivery_type": "",
               "dom_complete": 5.30179999999702,
               "dom_content_loaded_event_end": 3.6295,
               "dom_content_loaded_event_start": 3.53090000000596,
               "domain_lookup_end": 0.022,
               "domain_lookup_start": 0.0219000000059605,
.....
```


Browser item parameters

It is possible to send custom parameters to the JavaScript:

- Write name and value pairs in the Parameters
- User macros can be used as the browser item parameters




```
const browser = new Browser(Website.getOptions(Website.params.browser));
```

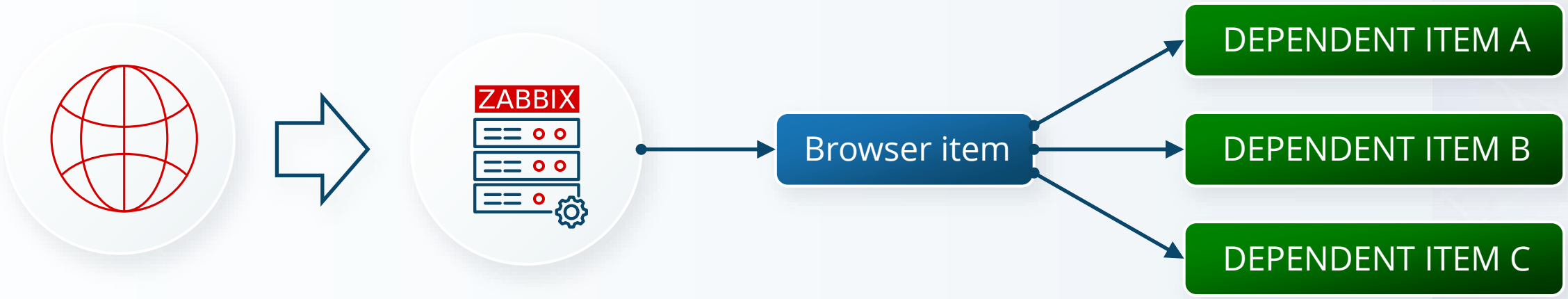
Individual metrics

Data are extracted from the browser item using dependent items:

- Browser item collects data in JSON format
- Dependent items use the JSONPath preprocessing step to extract data

Browser item and dependent items

Name	Triggers	Key	Interval	History	Trends	Type	Status
Website Get data		website.get.data	5m	0		Browser	Enabled
Website Get data: Navigation response time		website.navigation.response_time		31d	0	Dependent item	Enabled
Website Get data: Navigation request time		website.navigation.request_time		31d	0	Dependent item	Enabled
Website Get data: Navigation encodedBody size		website.navigation.encoded_size		31d	0	Dependent item	Enabled
Website Get data: Navigation domContentLoaded time		website.navigation.dom_content_loaded_time		31d	0	Dependent item	Enabled
Website Get data: Navigation DNS lookup time		website.navigation.dns_lookup_time		31d	0	Dependent item	Enabled



Monitoring scenarios

Advanced scenarios

Monitoring scenarios are created in JavaScript (Duktape engine)

Because browser item emulates a real browser, it is possible to:

- Log on and log out from the website
- Fill and submit different forms
- Navigate through multiple pages
- Simulate a click on the webpage
- Create complex if - then scenarios

Homepage monitoring

Scenario: Simulate a user opening the website's homepage

Steps:

- Navigate to the homepage URL
- Measure the time it takes for the page to fully load
- Check for any errors or missing elements

Purpose: Ensure the homepage loads quickly and correctly

Navigation Flow Test

Scenario: Simulate a user navigating through multiple pages

Steps:

- Navigate to the homepage
- Click on a main menu link to go to a secondary page
- From the secondary page, navigate to another linked page
- Return to the homepage using the site's navigation

Purpose: Verify that navigation links work correctly

Login functionality test

Scenario: Simulate a user logging into the website

Steps:

- Navigate to the login page
- Enter a valid username and password
- Click the login button
- Verify successful login by checking for a specific element on the page

Purpose: Confirm that the login process is functional and secure.

Search Functionality Test

Scenario: Simulate a user performing a search on the website.

Steps:

- Navigate to the search page
- Enter a search query into the search bar
- Click the search button
- Verify that search results are displayed and relevant to the query

Purpose: Ensure the search feature works correctly

Shopping Cart and Checkout Test

Scenario: Simulate a user adding items to the shopping cart and completing a purchase

Steps:

- Navigate to a product page
- Add the product to the shopping cart
- Proceed to the checkout page and enter payment and shipping information
- Complete the purchase
- Verify order confirmation and receipt

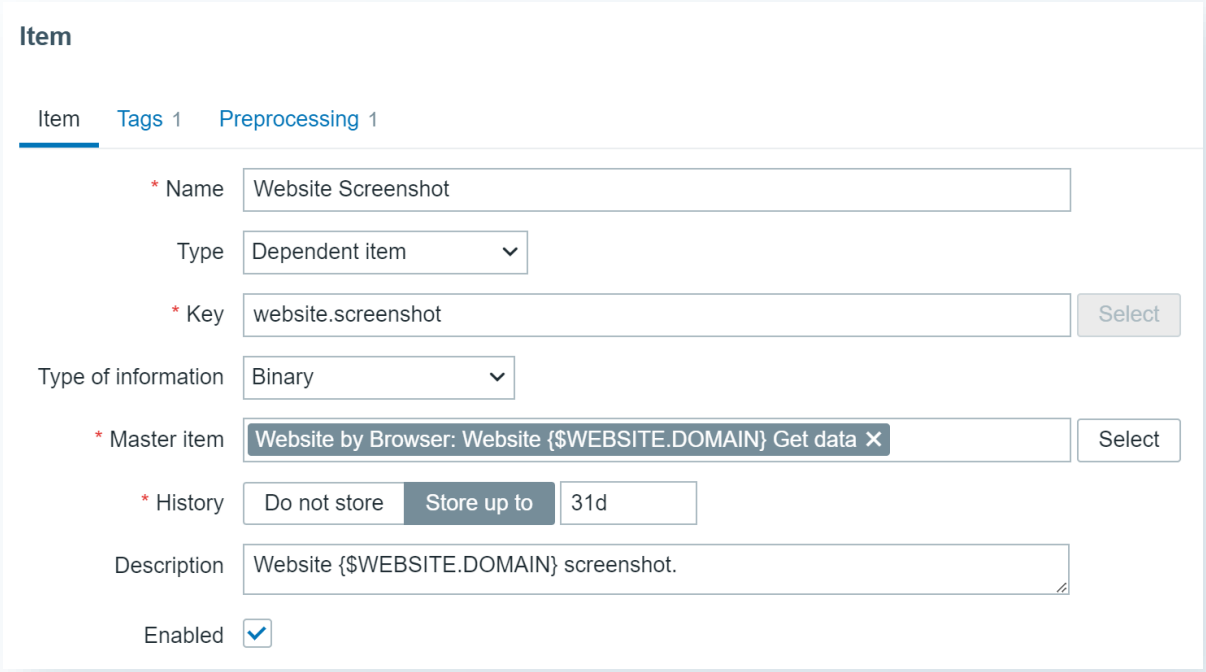
Purpose: Ensure the shopping and checkout process are functional

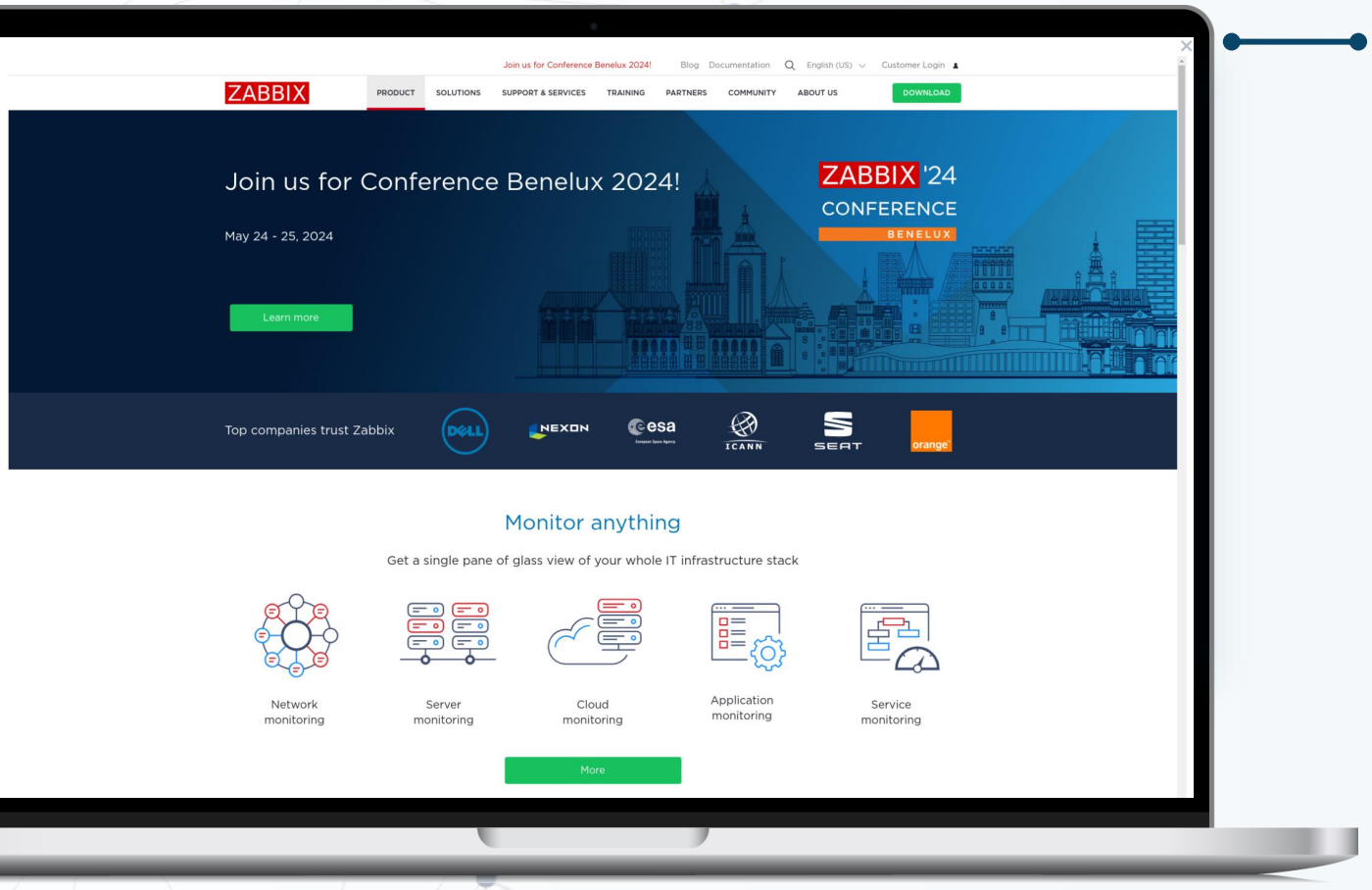
Screenshots

Taking screenshots

The browser item can take screenshot from the monitored pages:

- Screenshot is included in the JSON object in base64 format
- It is extracted into a binary dependent item





Screenshot details

Zabbix supports up to 8K x 8K screenshots

- Default size is 1920 x 1080
- Screenshot can be displayed using the "Item history" widget
- Screenshot size is specified by the browser.setScreenSize(x,y) method

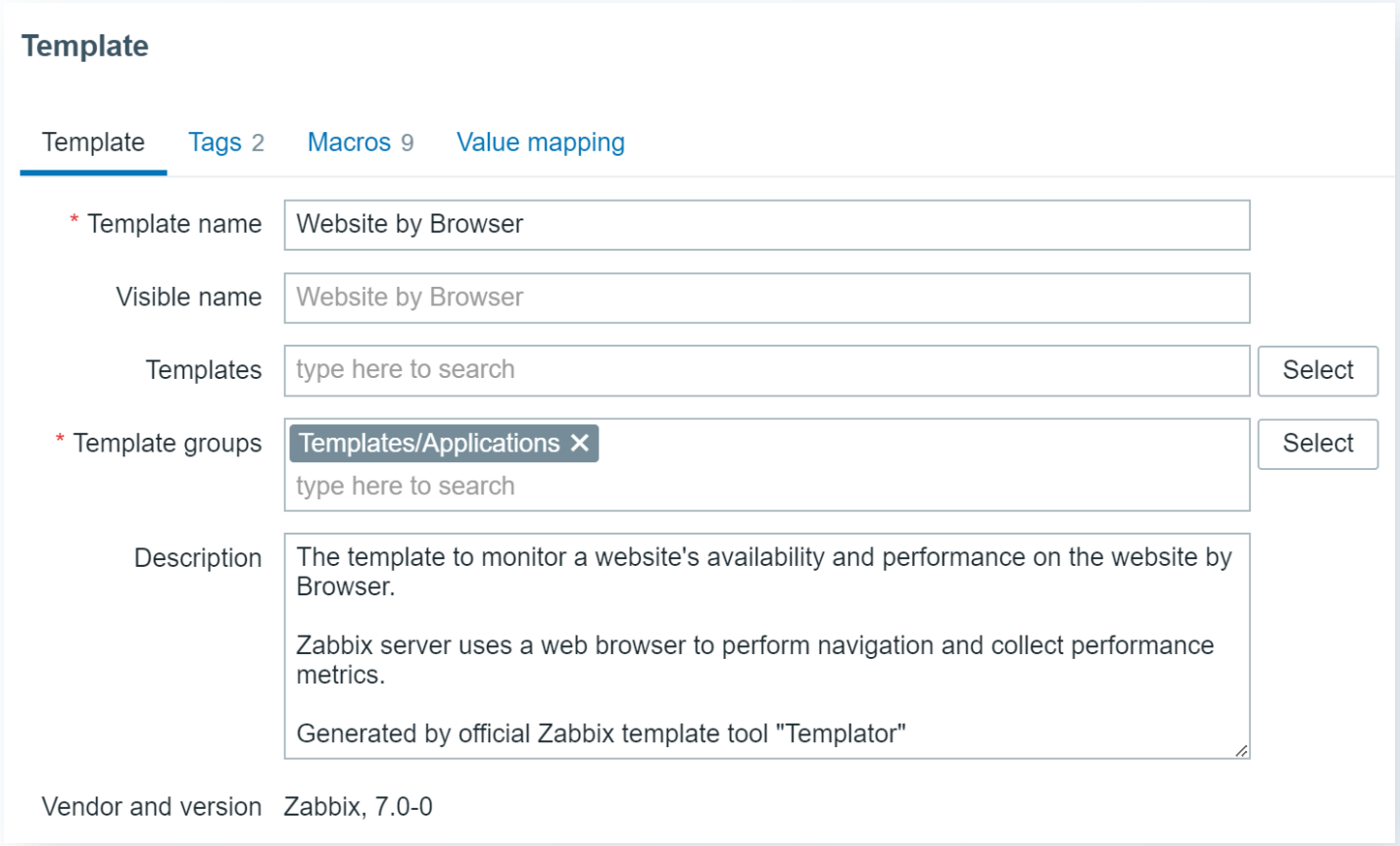
Item history widget example

Timestamp	Screenshot
2024-05-22 01:46:28 PM	
2024-05-22 01:44:28 PM	
2024-05-22 01:43:26 PM	
2024-05-22 01:42:28 PM	
2024-05-22 01:41:28 PM	
2024-05-22 01:40:28 PM	
2024-05-22 01:39:29 PM	
2024-05-22 01:38:28 PM	

Out-of-box monitoring

Website by Browser template

Zabbix 7.0 comes with the "Website by Browser" template

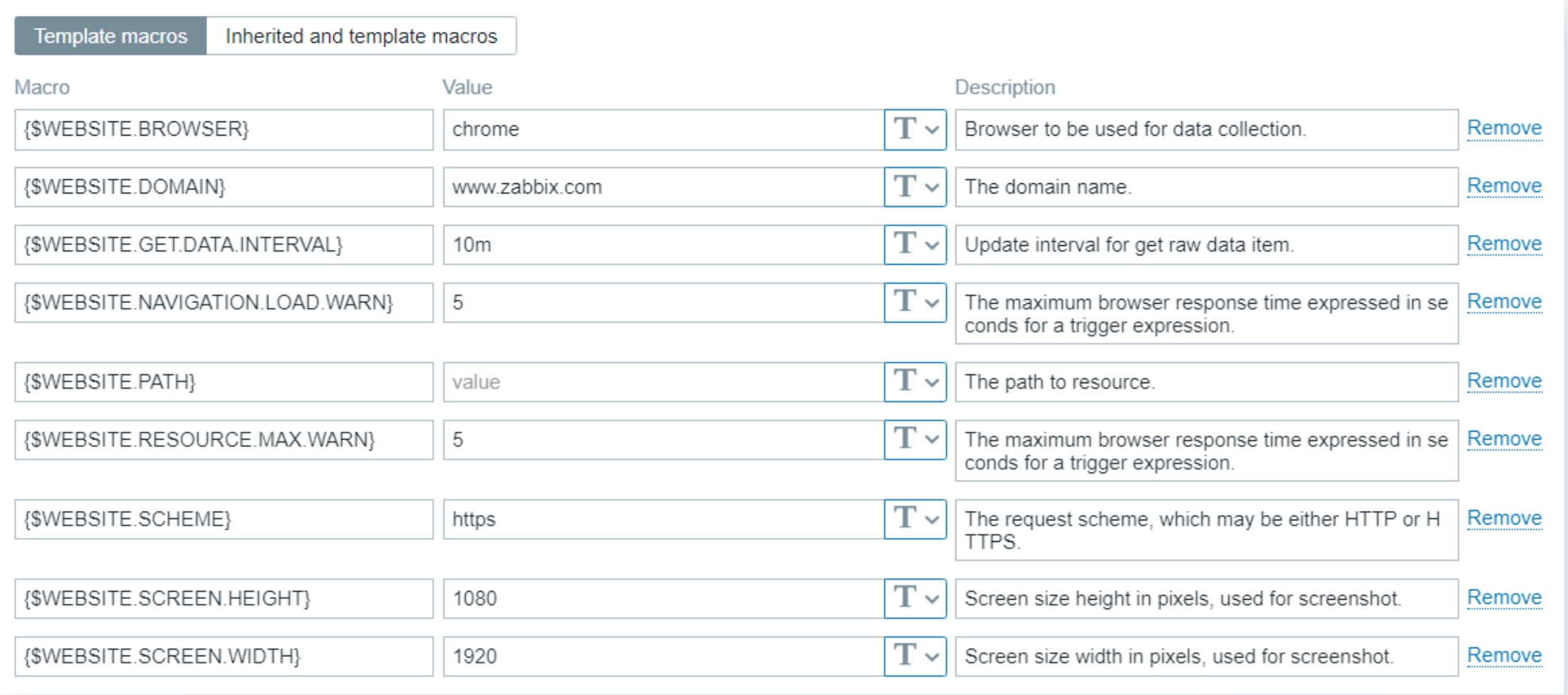


Template content

The new template includes:

- A "Browser" item with a data collection script
- 26 dependent items for individual metrics
- 3 predefined triggers
  - Failed to get metrics data
  - Website navigation load event time is too slow
  - Website resource load event time is too slow
- 9 User macros (browser type, site name, screenshot dimensions, etc)
- 2 predefined graphs
- A host dashboard

Specifying monitoring parameters



Predefined browsing script

ZABBIX

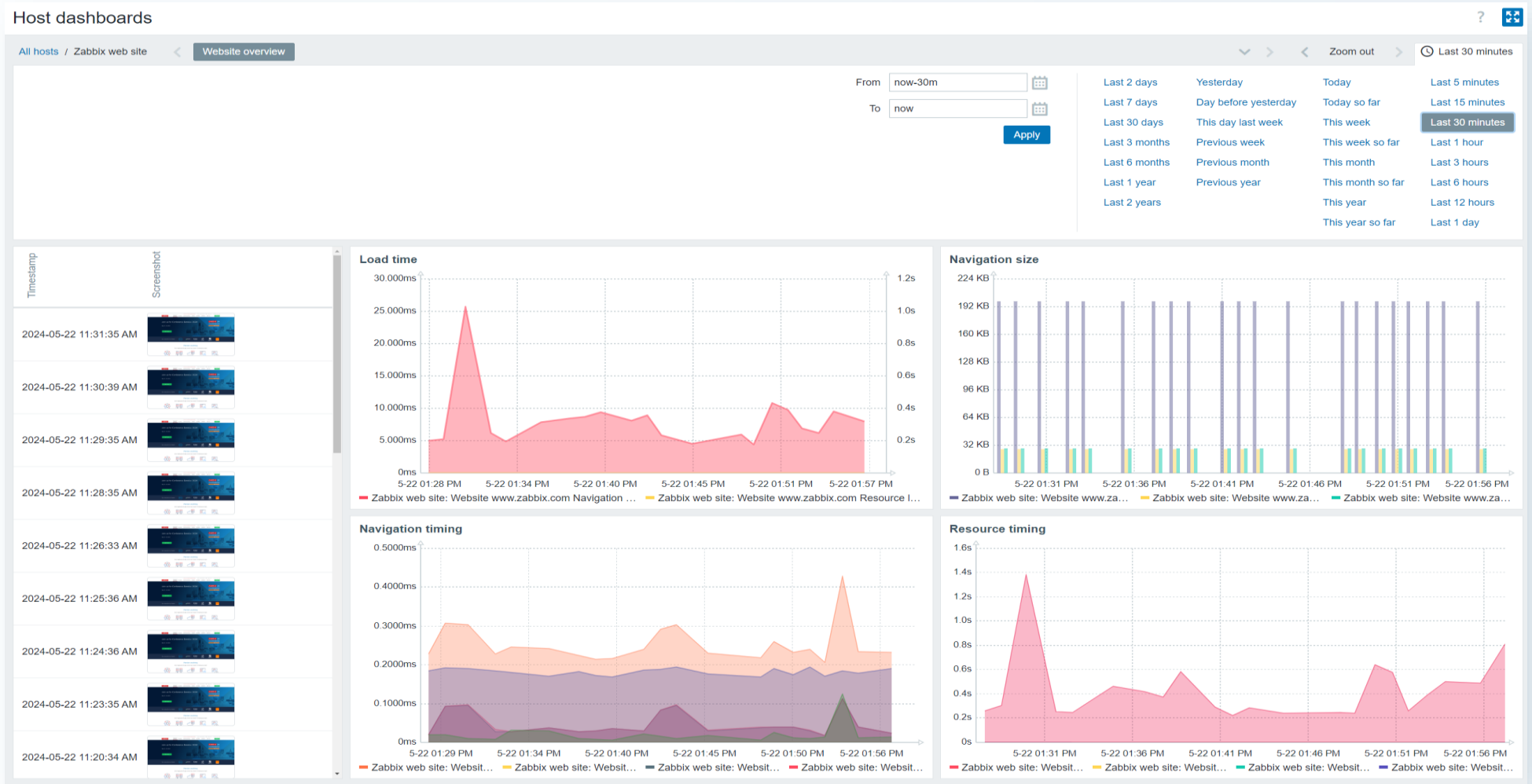
JavaScript

```
    getPerformance() {
        const browser = new Browser(Website.getOptions(Website.params.browser));
        const url = Website.params.scheme + '://' + Website.params.domain + '/' + Website.params.path
        const screenshot = '';
        browser.setScreenSize(Number(Website.params.width), Number(Website.params.height))
        browser.navigate(url);
        browser.collectPerfEntries();
        screenshot = browser.getScreenshot();
        const result = browser.getResult();
        result.screenshot = screenshot;

        return JSON.stringify(result);
    }
};

try {
    Website.setParams(JSON.parse(value));
    return Website.getPerformance();

} catch (error) {
    error += (String(error).endsWith('.')) ? '' : '.';
    Zabbix.log(3, '[ Website get metrics] ERROR: ' + error);
    return JSON.stringify({ 'error': error });
```

63959 characters remaining

Apply Cancel

Result


Host dashboards
All hosts / Zabbix web site
Website overview
Zoom out
Last 30 minutes
From
now-30m
To
now
Apply
Last 2 days
Last 7 days
Last 30 days
Last 3 months
Last 6 months
Last 1 year
Last 2 years
Yesterday
Day before yesterday
This day last week
Previous week
Previous month
Previous year
Today
Today so far
This week
This week so far
This month
This month so far
This year
This year so far
Last 5 minutes
Last 15 minutes
Last 30 minutes
Last 1 hour
Last 3 hours
Last 6 hours
Last 12 hours
Last 1 day
Timestamp
Screenshot
2024-05-22 11:31:35 AM
2024-05-22 11:30:39 AM
2024-05-22 11:29:35 AM
2024-05-22 11:28:35 AM
2024-05-22 11:26:33 AM
2024-05-22 11:25:36 AM
2024-05-22 11:24:36 AM
2024-05-22 11:23:35 AM
2024-05-22 11:20:34 AM
Load time
Navigation size
Navigation timing
Resource timing

ZABBIX

Thank you

Kaspars Mednis

Training project manager