Accessibility Consulting Jenkins Accessibility Research Results

Telecom IT

version	1.0
was standing	02/11/2022
status	Final
author	Cordula Ulbricht

Protection class: Internal

imprint

editor

Usability & Accessibility Team

Deutsche Telekom IT GmbH
Digital Transformation and Operations, E-DTOPT0203
Holzhauser Str. 4-8, 13509 Berlin

filename	document number	document label
Jenkins_AccessibilityExamination_Report.docm	BF_Jenkins_1.0	report

version	was standing	status
1.0	02/11/2022	Final

author	quality assurance	Released by
Cordula Ulbricht	Frank Breidenstein	Frank Breidenstein
Cordula.Ulbricht@t-systems.com	Frank.Breidenstein@telekom.de	Frank.Breidenstein@telekom.de
Berlin, February 10, 2022	Dortmund, February 11, 2022	Dortmund, February 11, 2022

contact person	phone	e-mail
Susanne Wasserroth	+ 49 30 8353 24260	susanne.wasserroth@t-systems.com

quick info

This test report contains the results of the Jenkins 2.319.2 accessibility study.

Table of contents

Management summary

From 12/01/2021 to 01/27/2022 the application Jenkins version 2.319.2 was subjected to an accessibility test. The accessibility study was carried out in the form of a checklist-based, tool-supported expert evaluation. This report contains the documentation and the results of this expert evaluation.

Summary and overall test result

Overall, the number and severity of the identified accessibility issues result in the following overall result:

☹ Jenkins accessibility is **highly limited**.

In the accessibility study, 50 test criteria were used, which are based on the underlying requirements of BITV 2.0 or WCAG 2.0 and WCAG 2.1 (see Section A.3).

Based on these assessment criteria, 18 Jenkins accessibility issues were identified, varying in severity. They present themselves to the affected users as either a serious blockage, a major hurdle or minor impairments. (More information on this categorization can be found in Section A.4.)

For an overview of how many issues were identified in each category, see the table below:

category	**Number**
blockade	0
hurdle	7
impairments	11
total	**18**

Table 1.1: Overview of the total number of identified problems per category

Detailed information on the calculation of the test result can be found in Annex A.5.

Differentiation of the test result according to user groups

A more differentiated picture may emerge for the individual user groups affected (cf. Appendix D), depending on whether the identified problems are relevant for the respective user group. Therefore, in the following, the individual user groups are considered according to their limitations.

Motorized users

😐 Jenkins is for users with motor disabilities **restricted access**.

Visually Impaired Users

🙂 Jenkins is for visually impaired users **easily accessible**.

blind users

☹ Jenkins is for blind users **severely restricted access**.

Hearing Impaired Users

😊 Jenkins is for the hearing impaired **very accessible**.

Overview of the type and number of identified problems by user group

category	**visually impaired designated users**	**blind people user**	**motoric in restricted user**	**hearing impaired said users**
blockade	0	0	0	0
hurdle	0	6	3	0
impairments	2	9	4	0
total	**2**	**15**	**7**	**0**

Table 1.2: Overview of the type and number of identified problems by user group

Content summary

An overview of the identified problems and the respective category as well as the affected user groups can be found in the following table:

problem	category	Affected user groups
The skip link to the main content is not displayed.	impairment	motorically affected pregnant users
Page sections are not efficiently skippable.	impairment	motorically affected pregnant users blind users
There is a loss of focus in important places.	impairment	motorically affected pregnant users blind users
Important content cannot be accessed and operated using the keyboard.	hurdle	motorically affected pregnant users blind users
Some content is unusual for keyboard users to operate.	impairment	motorically affected pregnant users blind users
Orientation and navigation in the application are difficult.	hurdle	blind users
The focus order is not logical in some places.	hurdle	motorically affected pregnant users blind users
Individual visual headings are not structured semantically.	impairment	blind users
Tabs cannot be perceived as such by the blind.	impairment	blind users
Table contents can tw. are not correctly perceived.	hurdle	blind users
Many linked UI elements are not clearly labeled.	hurdle	blind users
Form labels are e.g. T. not programmatically determined.	hurdle	motorically affected pregnant users blind users
Input fields for user data do not convey the purpose.	impairment	blind users
Graphic evaluations are not accessible.	best practices	blind users
Decorative graphics are not hidden for blind users.	impairment	blind users
Content does not wrap properly at 400%.	impairment	visually impaired user

problem	category	Affected user groups
Some content is not easily recognizable due to poor contrast.	hurdle	visually impaired user
Graphic information is conveyed only by color.	best practices	visually impaired user
The main language of the application is not specified correctly.	impairment	blind users
Many English terms are used in the German interface.	impairment	blind users

Table 1.3: Content overview of the identified problems

See Section 2 for details on the issues.

Structure of the document

The document is structured as follows:

- Section 2 contains the detailed results section, in which negative findings or identified problems with regard to accessibility as well as the derived requirements and recommendations are described. In addition, results may be included that give recommendations for optimization without the underlying finding representing a relevant impairment (“Best Practice” category). The remaining findings (ie met and non-applicable accessibility criteria) are not listed separately here for reasons of clarity.
- A clear list of all results can be found in the list of results on page 8.
- A list of all issues and recommendations is also provided in a separate Excel file with the report. It can be used further as a list of measures to rectify the identified problems.
- The appendices contain further details on the procedure, boundary conditions, principles and methodology of the investigation as well as our declaration of independence.

1 list of results

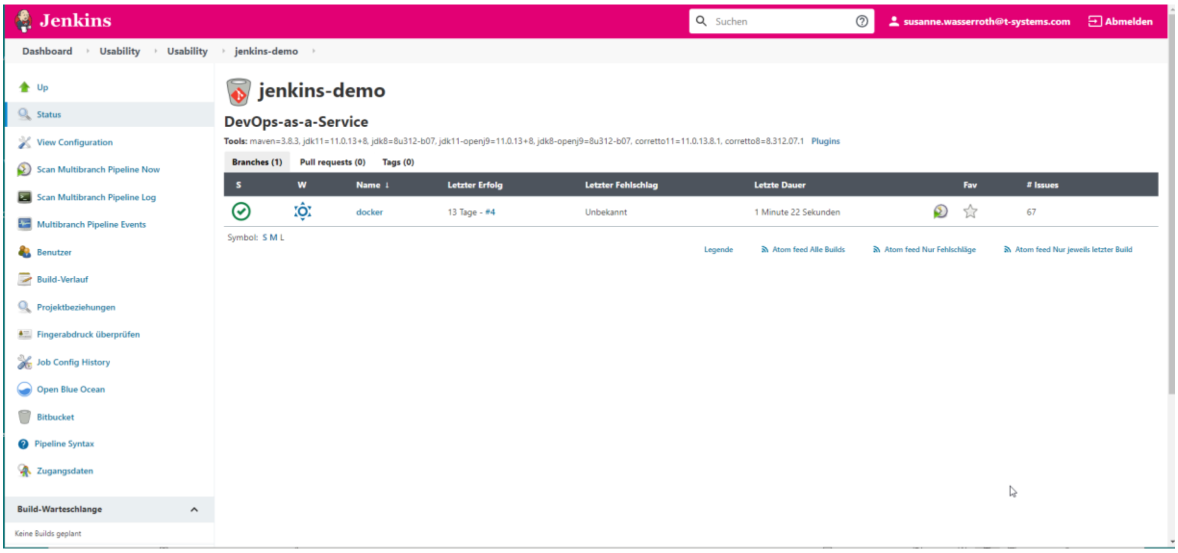
2 results

This section presents the results of the investigation in the following format:

Result 0. Short core statement

✓ Possibly positive aspects.

Dedicated description of the facts or the problem, possibly supplemented with screenshots.



jenkins-demo

DevOps-as-a-Service

Tools: maven=3.8.3, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Fav	# Issues
✓	☼	docker	13 Tage - #4	Unbekannt	1 Minute 22 Sekunden	☆	67

Figure 2.1: Example screenshot of the application

!Explanation of connections, interpretation or evaluation

→ recommendations

context	navigation area, side area, field, function, button
criteria	Indication of the affected accessibility criteria
user groups	blind | Visually Impaired | Motorically impaired people | hearing impaired
category	impairment | hurdle | blockade | best practices

The description contains the following components:

- The first line contains a concise designation of the result.
- A detailed description of the finding follows below this line. Within this description, screenshots, positive aspects (identification✓) as well as additional explanations or interpretation of the observations (identification**!**) and recommendations for action (marking→)listed.
- The context is then reproduced for the purpose of better assignment of the described result. Here, superordinate and subordinate areas or

consecutive actions separated by ">". "General" is indicated for general problems that occur again and again.

- The accessibility criteria that are affected by the problem described are then specified.
- Then the user groups affected by the problem are specified.
- Finally, under Category, the classification is made with regard to the degree of severity (impairment, hurdle or blockage). In addition, a fourth category, "Best Practice", indicates a result that does not have a negative impact on the overall result, but indicates important potential for improvement

Annotation:

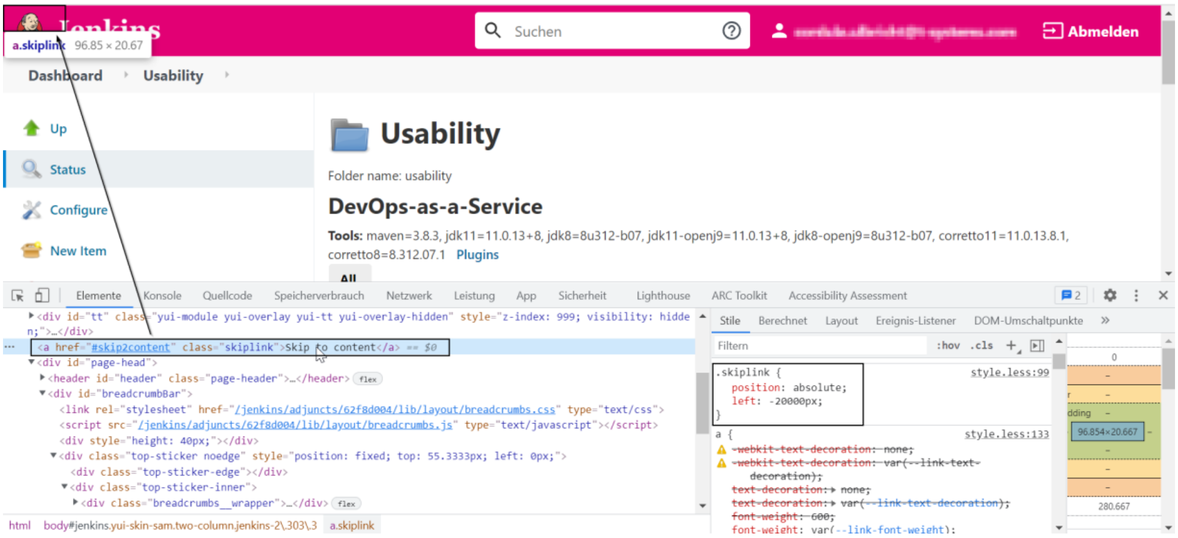
As a rule, only problematic or "best practice" findings are explained in the results section. Fulfilled or non-applicable criteria can be found in the attached Excel list ("Checklist" sheet). Only in exceptional cases are fulfilled or non-applicable test criteria listed in this section, e.g. B. if a particularly good implementation of individual accessibility requirements has been determined.

2.1 Keyboard operation and navigation

Result 1. The skip link to the main content is not displayed.

✓ There is a skip link to the main content.

However, the skip link is not visible when focus is maintained, so keyboard users cannot see and use the link.



Usability

Folder name: usability

DevOps-as-a-Service

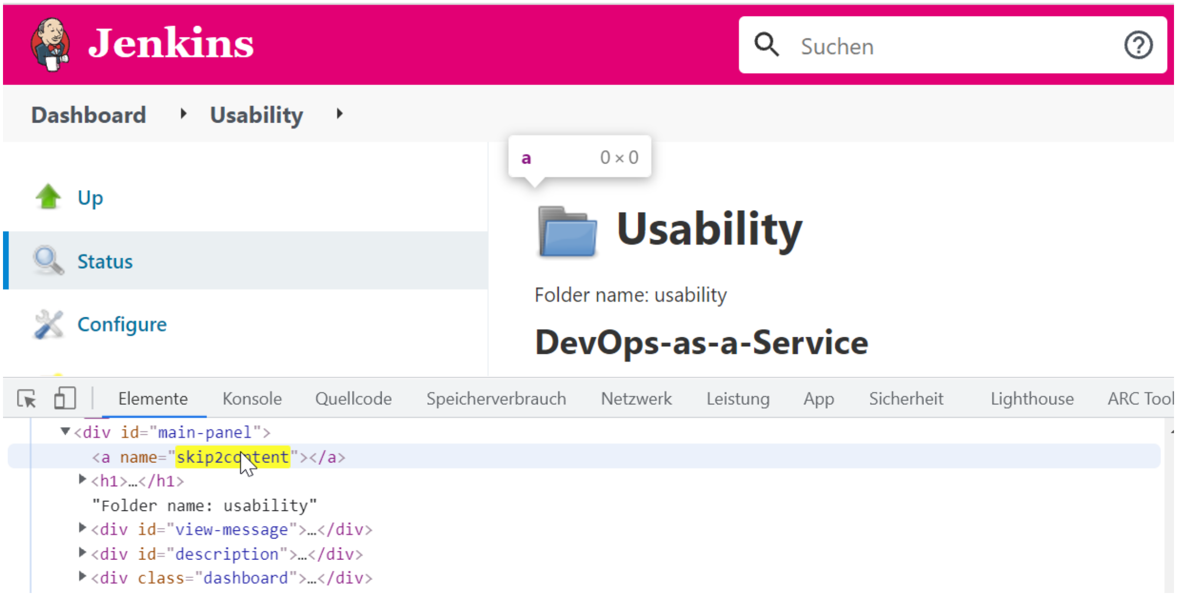
Tools: maven=3.8.3, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

```
▸<div id="tt" class="yui-module yui-overlay yui-tt yui-overlay-hidden" style="z-index: 999; visibility: hidden;">…</div>
 <a href="#skip2content" class="skiplink">Skip to content</a> == $0
▾<div id="page-head">
  ▸<header id="header" class="page-header">…</header> flex
  ▾<div id="breadcrumbBar">
     <link rel="stylesheet" href="/jenkins/adjuncts/62f8d004/lib/layout/breadcrumbs.css" type="text/css">
     <script src="/jenkins/adjuncts/62f8d004/lib/layout/breadcrumbs.js" type="text/javascript"></script>
     <div style="height: 40px;"></div>
    ▾<div class="top-sticker noedge" style="position: fixed; top: 55.3333px; left: 0px;">
       <div class="top-sticker-edge"></div>
      ▾<div class="top-sticker-inner">
        ▸<div class="breadcrumbs__wrapper">…</div> flex
```

```
.skiplink {                                   style.less:99
  position: absolute;
  left: -20000px;
}
a {                                           style.less:133
  ~~-webkit-text-decoration: none;~~
  ~~-webkit-text-decoration: var(--link-text-
    decoration);~~
  ~~text-decoration:▸ none;~~
  ~~text-decoration:▸ var(--link-text-decoration);~~
  ~~font-weight: 600;~~
  font-weight: var(--link-font-weight);
```

Figure 2.2: Skip link not visible when maintaining focus

! In addition, the existing skip link has no discernible function. The jump target "skip2content" is defined with "name" instead of "id". "name" is not a valid attribute for the <a> element.



```
▼<div id="main-panel">
   <a name="skip2content"></a>
  ▶<h1>…</h1>
   "Folder name: usability"
  ▶<div id="view-message">…</div>
  ▶<div id="description">…</div>
  ▶<div class="dashboard">…</div>
```

Figure 2.3: Skip link target not correctly referenced

! Skip links are used by motor-impaired and blind users to skip recurring areas, such as e.g. B. the navigation, directly to the main content area and thus support efficient navigation.

→ The skip link should become visually visible when focus is obtained. To do this, the position of the skip link must be moved to the visible area using CSS[1].

→ Use id="skip2content" for the jump target.

context	Skip link at top of page
criteria	2.4.1 Bypassing Element Groups
user groups	motor impaired
category	impairment

Result 2. Page areas are not efficiently skippable.

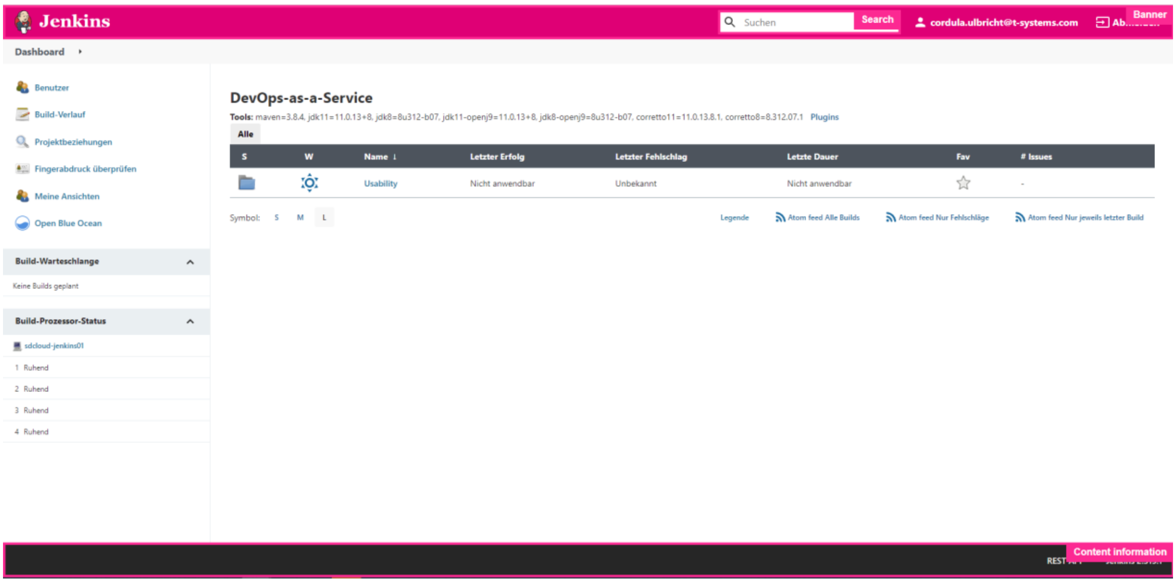
✓ There are three page areas marked as regions with the corresponding HTML5 elements <header> and <footer> and role="search".

However, important areas of the page cannot be set as a region[2]are perceived and also not directly jumped to or skipped. It's missing

[1] Detailed recommendations for the implementation of skip links are provided e.g. B.https://webaim.org/techniques/skipnav/ andhttps://dev.to/ziizium/how-to-implement-accessibility-skip-to-content-4d8m .

[2] Detailed recommendations for using the regions are provided e.g. B.https://www.w3.org/WAI/tutorials/page-structure/regions/ .

Identification of the breadcrumb and sidebar navigation areas, the area with additional information about the builds in the lower sidebar, and the main content area.



DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Fav	# Issues
		Usability	Nicht anwendbar	Unbekannt	Nicht anwendbar	☆	-

Figure 2.4: Missing identification of the main content area as a side area

! In addition to headings, side areas offer a possibility for structural navigation. However, if not all areas of the application are semantically marked as such, they cannot be accessed directly by screen reader or keyboard users (via browser add-on).

→ The breadcrumb and the sidebar are to be marked as navigation areas with the <nav> element. To distinguish between the two navigation areas, a meaningful aria label must be assigned, which makes it clear which navigation area is involved. The main content area is to be marked with the <main> element.

context	Generally; entire application
criteria	2.4.1 Bypassing Element Groups
user groups	blind | motor impaired
category	impairment

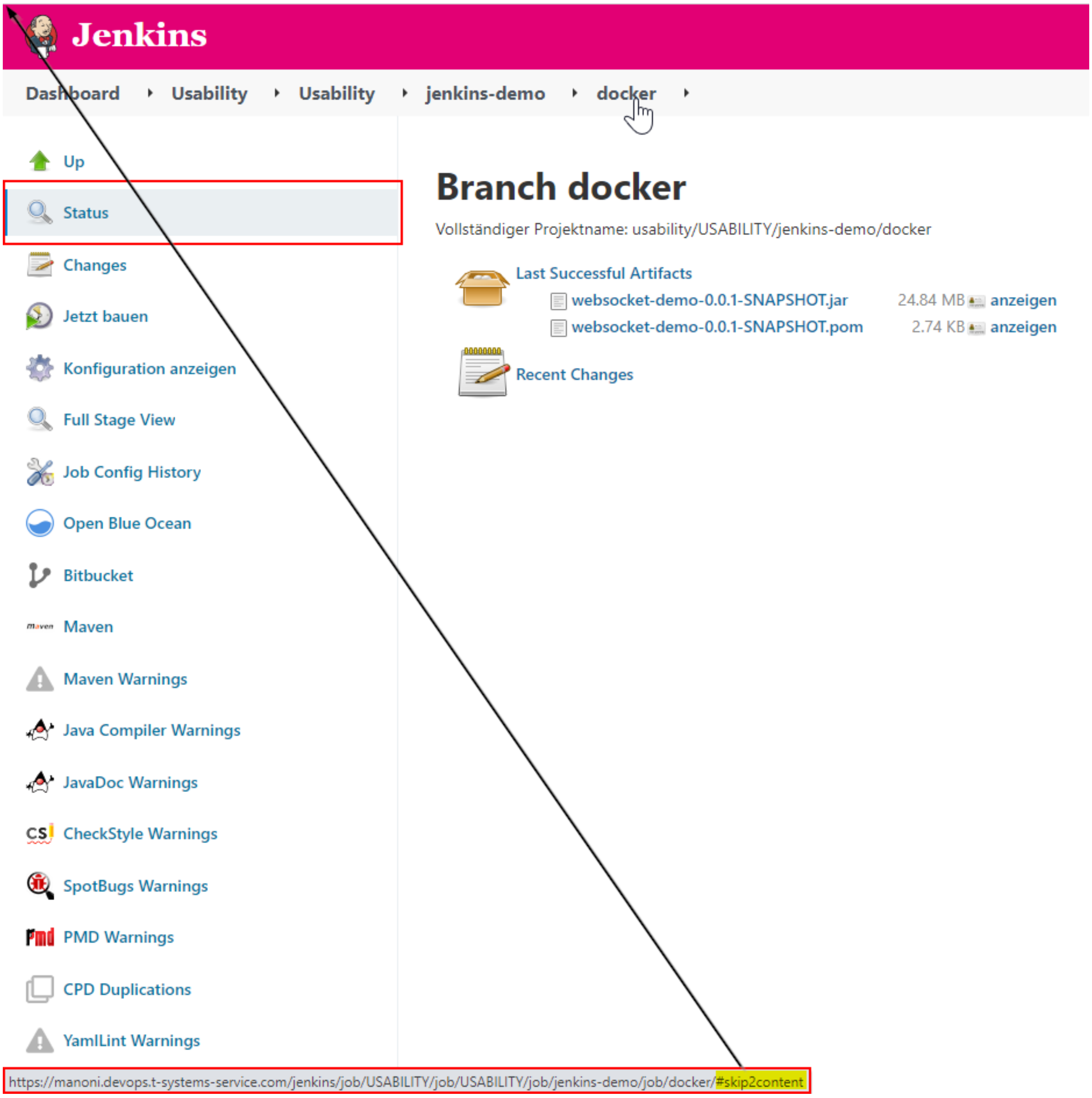
Result 3. There is a loss of focus in important places.

After selecting individual interactive elements, the focus is lost and the focus is set to the top of the page. This leads to considerable effort for users who are dependent on keyboard operation. This problem has been noticed at the following important points:

- Operating the menu > new page content is not directly focused
- Selection of radio buttons > focus is set to the top of the page

After selecting a menu item from the navigation menu and then loading the new pages, the keyboard focus is shifted to the top of the page. Screen reader users are not notified of the new content and must navigate again from the top of the page to the actual main content of the page. Since the main content area is not marked as a region either, the navigation menu here cannot be skipped. (See result 2)

Even users with motor disabilities cannot navigate efficiently, since the keyboard focus is shifted to the top of the page after selecting a menu item.



Branch docker

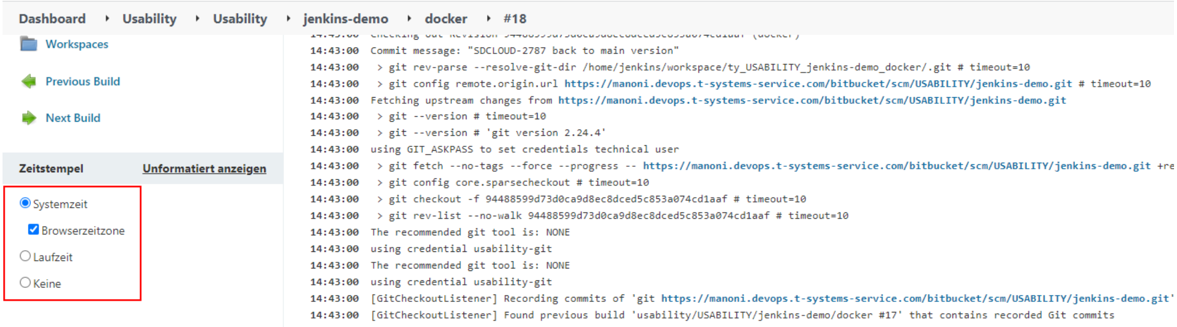
Vollständiger Projektname: usability/USABILITY/jenkins-demo/docker

websocket-demo-0.0.1-SNAPSHOT.jar	24.84 MB	anzeigen
websocket-demo-0.0.1-SNAPSHOT.pom	2.74 KB	anzeigen

https://manoni.devops.t-systems-service.com/jenkins/job/USABILITY/job/USABILITY/job/jenkins-demo/job/docker/#skip2content

Figure 2.5: Focus is not set to the content area after selecting a menu item, but to the top of the page

The timestamp to be displayed can be set in the console output. The various options can be selected using a radio button. When selecting an option, the focus does not remain on the interactive element but is set to the top of the page.



● Systemzeit
☑ Browserzeitzone
○ Laufzeit
○ Keine

```
14:43:00  Commit message: "SDCLOUD-2787 back to main version"
14:43:00   > git rev-parse --resolve-git-dir /home/jenkins/workspace/ty_USABILITY_jenkins-demo_docker/.git # timeout=10
14:43:00   > git config remote.origin.url https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git # timeout=10
14:43:00  Fetching upstream changes from https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git
14:43:00   > git --version # timeout=10
14:43:00   > git --version # 'git version 2.24.4'
14:43:00  using GIT_ASKPASS to set credentials technical user
14:43:00   > git fetch --no-tags --force --progress -- https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git +re
14:43:00   > git config core.sparsecheckout # timeout=10
14:43:00   > git checkout -f 94488599d73d0ca9d8ec8dced5c853a074cd1aaf # timeout=10
14:43:00   > git rev-list --no-walk 94488599d73d0ca9d8ec8dced5c853a074cd1aaf # timeout=10
14:43:00  The recommended git tool is: NONE
14:43:00  using credential usability-git
14:43:00  The recommended git tool is: NONE
14:43:00  using credential usability-git
14:43:00  [GitCheckoutListener] Recording commits of 'git https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git'
14:43:00  [GitCheckoutListener] Found previous build 'usability/USABILITY/jenkins-demo/docker #17' that contains recorded Git commits
```

Figure 2.6: After selecting a radio button, the focus is set to the top of the page

! For efficient navigation, the focus should be on the new content for dynamically displayed content using Java Script, so that blind and motorized users can see it directly.

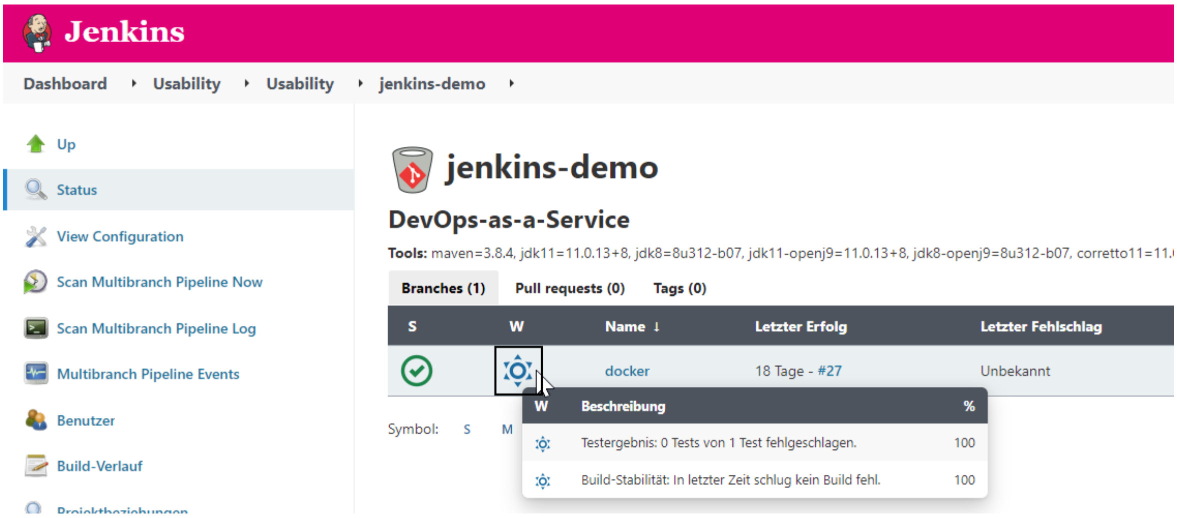
→ It makes sense to set the focus directly on the first heading in the new content, so that non-sighted keyboard users in particular receive an orientation reference to the new content. To do this, this heading must also be made focusable with tabindex="-1" so that the focus can be set via JavaScript.

context	Left navigation menu > select a menu item Usability test project: Dashboard > Usability folder > Usability project > Jenkins-demo repository > docker branch > Build #18 > Console output > Timestamp radio buttons
criteria	2.4.3 Focus Order
user groups	blind | motor impaired
category	impairment

Result 4. Important content cannot be accessed and operated using the keyboard.

Individual important content is only visualized as a tool tip when operated with the mouse. Keyboard users and screen reader users therefore have no way of having this information displayed or read out. The following examples stood out:

- "Weather icon in Branches table: a tooltip above the icon shows a short report summarizing the results of the latest builds



jenkins-demo

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.

Branches (1) Pull requests (0) Tags (0)

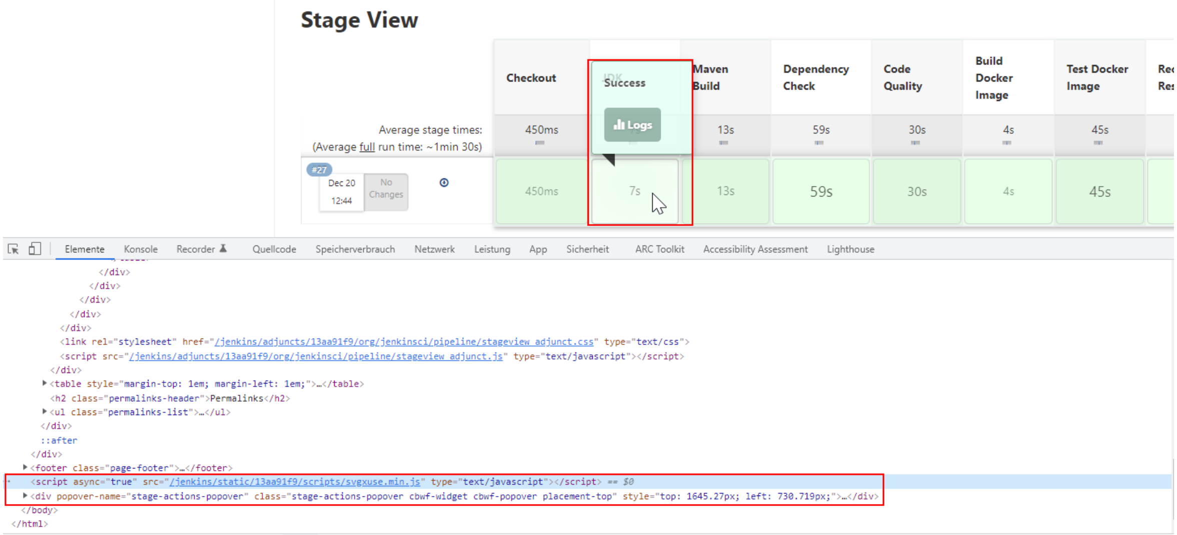
S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag
✓	☼	docker	18 Tage - #27	Unbekannt

Symbol: S M

W	Beschreibung	%
☼	Testergebnis: 0 Tests von 1 Test fehlgeschlagen.	100
☼	Build-Stabilität: In letzter Zeit schlug kein Build fehl.	100

Figure 2.7: Short report only accessible via tooltip via "Weather" icon

- Success message and log file in Stage View table: The success message "Success" and the option to open and display the log file are only displayed as a tooltip when using the mouse.


Stage View

	Checkout	JDK	Maven Build	Dependency Check	Code Quality	Build Docker Image	Test Docker Image	Re Re
Average stage times: (Average full run time: ~1min 30s)	450ms	7s	13s	59s	30s	4s	45s	
#27 Dec 20 12:44 No Changes	450ms	7s	13s	59s	30s	4s	45s	

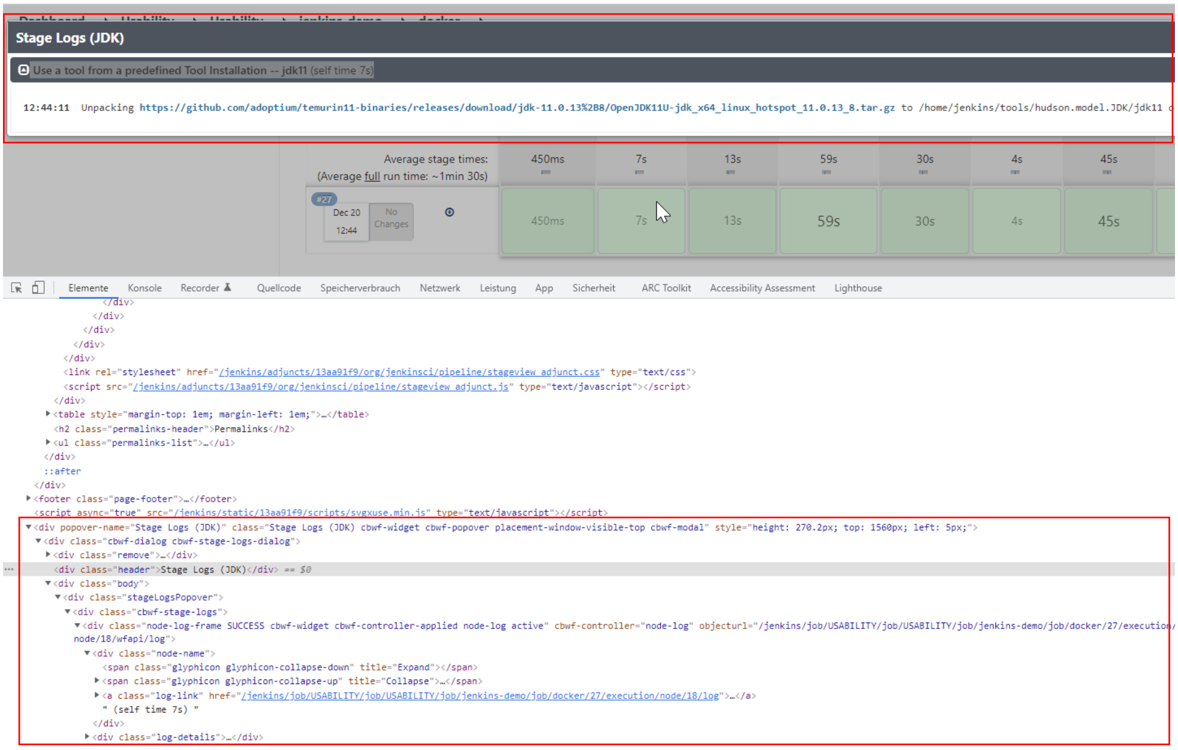
```
              </div>
            </div>
          </div>
        </div>
      </div>
      <link rel="stylesheet" href="/jenkins/adjuncts/13aa91f9/org/jenkinsci/pipeline/stageview_adjunct.css" type="text/css">
      <script src="/jenkins/adjuncts/13aa91f9/org/jenkinsci/pipeline/stageview_adjunct.js" type="text/javascript"></script>
    </div>
  ▸<table style="margin-top: 1em; margin-left: 1em;">…</table>
    <h2 class="permalinks-header">Permalinks</h2>
  ▸<ul class="permalinks-list">…</ul>
   </div>
   ::after
  </div>
 ▸<footer class="page-footer">…</footer>
  <script async="true" src="/jenkins/static/13aa91f9/scripts/svgxuse.min.js" type="text/javascript"></script> == $0
 ▸<div popover-name="stage-actions-popover" class="stage-actions-popover cbwf-widget cbwf-popover placement-top" style="top: 1645.27px; left: 730.719px;">…</div>
 </body>
</html>
```

Figure 2.8: "Open Logs" in Stage View table only accessible via tooltip

! This means that blind users and users with motor disabilities are denied the opportunity to take a detailed look at the log file into the build process. This is considered serious, as the usability test in particular has shown that the log file is an important tool for users.

After opening the log button, the log file is displayed.

! Note: The log file is not in the correct tab order. Even if opening with the keyboard were possible, the focus must also be placed in the opened log file.



```
12:44:11  Unpacking https://github.com/adoptium/temurin11-binaries/releases/download/jdk-11.0.13%2B8/OpenJDK11U-jdk_x64_linux_hotspot_11.0.13_8.tar.gz to /home/jenkins/tools/hudson.model.JDK/jdk11
```

```
              </div>
            </div>
          </div>
        </div>
      </div>
      <link rel="stylesheet" href="/jenkins/adjuncts/13aa91f9/org/jenkinsci/pipeline/stageview_adjunct.css" type="text/css">
      <script src="/jenkins/adjuncts/13aa91f9/org/jenkinsci/pipeline/stageview_adjunct.js" type="text/javascript"></script>
    </div>
  ▶<table style="margin-top: 1em; margin-left: 1em;">…</table>
    <h2 class="permalinks-header">Permalinks</h2>
  ▶<ul class="permalinks-list">…</ul>
  </div>
  ::after
</div>
▶<footer class="page-footer">…</footer>
<script async="true" src="/jenkins/static/13aa91f9/scripts/svgxuse.min.js" type="text/javascript"></script>
▼<div popover-name="Stage Logs (JDK)" class="Stage Logs (JDK) cbwf-widget cbwf-popover placement-window-visible-top cbwf-modal" style="height: 270.2px; top: 1560px; left: 5px;">
  ▼<div class="cbwf-dialog cbwf-stage-logs-dialog">
    ▶<div class="remove">…</div>
…    <div class="header">Stage Logs (JDK)</div> == $0
    ▼<div class="body">
      ▼<div class="stageLogsPopover">
        ▼<div class="cbwf-stage-logs">
          ▼<div class="node-log-frame SUCCESS cbwf-widget cbwf-controller-applied node-log active" cbwf-controller="node-log" objecturl="/jenkins/job/USABILITY/job/USABILITY/job/jenkins-demo/job/docker/27/execution/
          node/18/wfapi/log">
            ▼<div class="node-name">
                <span class="glyphicon glyphicon-collapse-down" title="Expand"></span>
              ▶<span class="glyphicon glyphicon-collapse-up" title="Collapse">…</span>
              ▶<a class="log-link" href="/jenkins/job/USABILITY/job/USABILITY/job/jenkins-demo/job/docker/27/execution/node/18/log">…</a>
                " (self time 7s) "
              </div>
            ▶<div class="log-details">…</div>
```

Figure 2.9: "Open Logs" in Stage View table only accessible via tooltip

- Legends for the trend charts: In the branch view, the various charts provide detailed information about the course, concrete values   of the various graphs at specific times, and display pop-ups that can only be made visible when using the mouse.

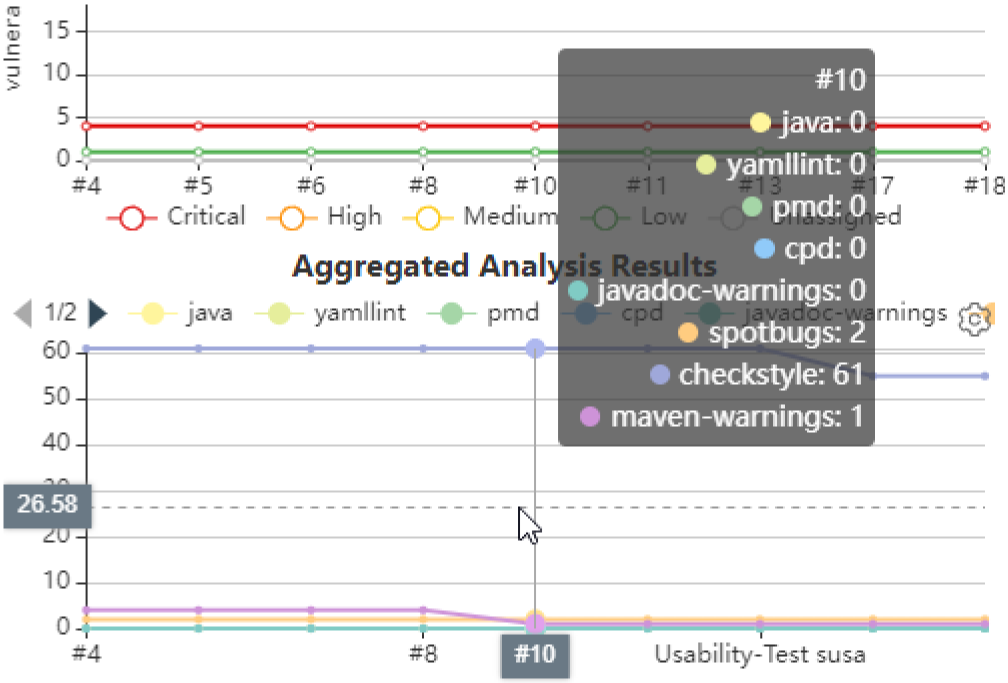


Figure 2.10: Legends for the trend charts only accessible via tool tip

! Note: There is an alternative tabular presentation of the values   for individual evaluations, provided that the corresponding menu items are selected and displayed, e.g. B. for "CheckStyle Warnings". For the representations of “Trend of the test results" and "Aggregated Analysis Results" this is not the case, see also result 14.

- Context menus offer additional options in various places, but can only be operated with the mouse

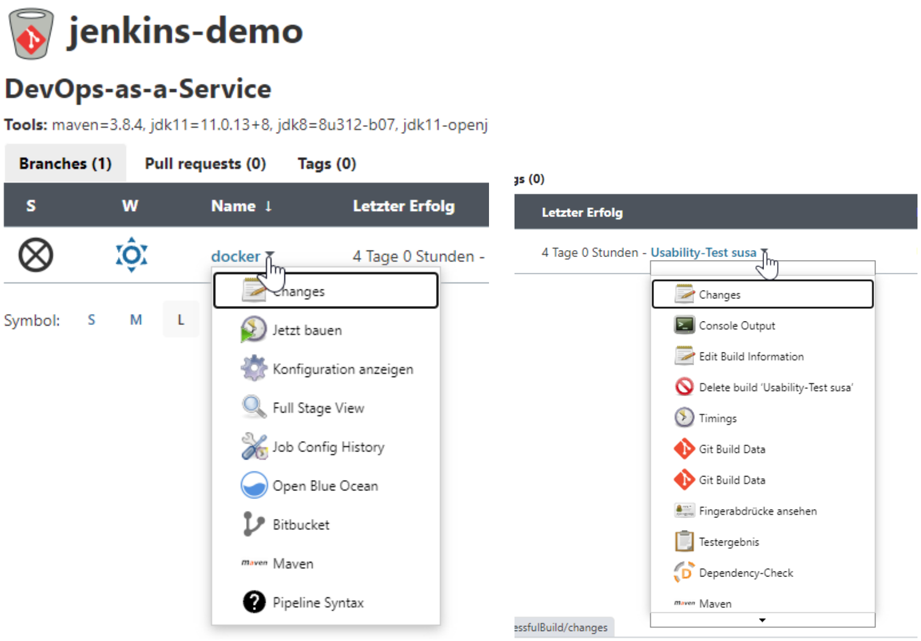


Figure 2.11: Context menus within the tables only accessible via tool tip

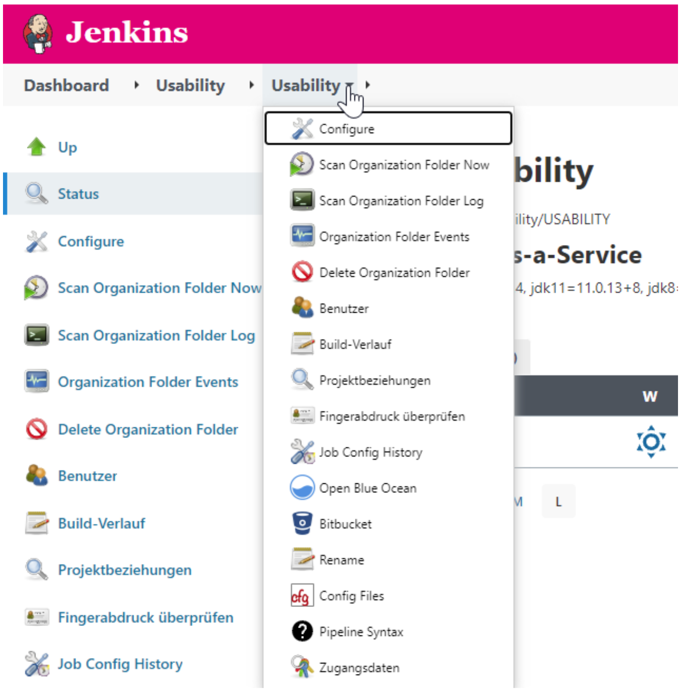
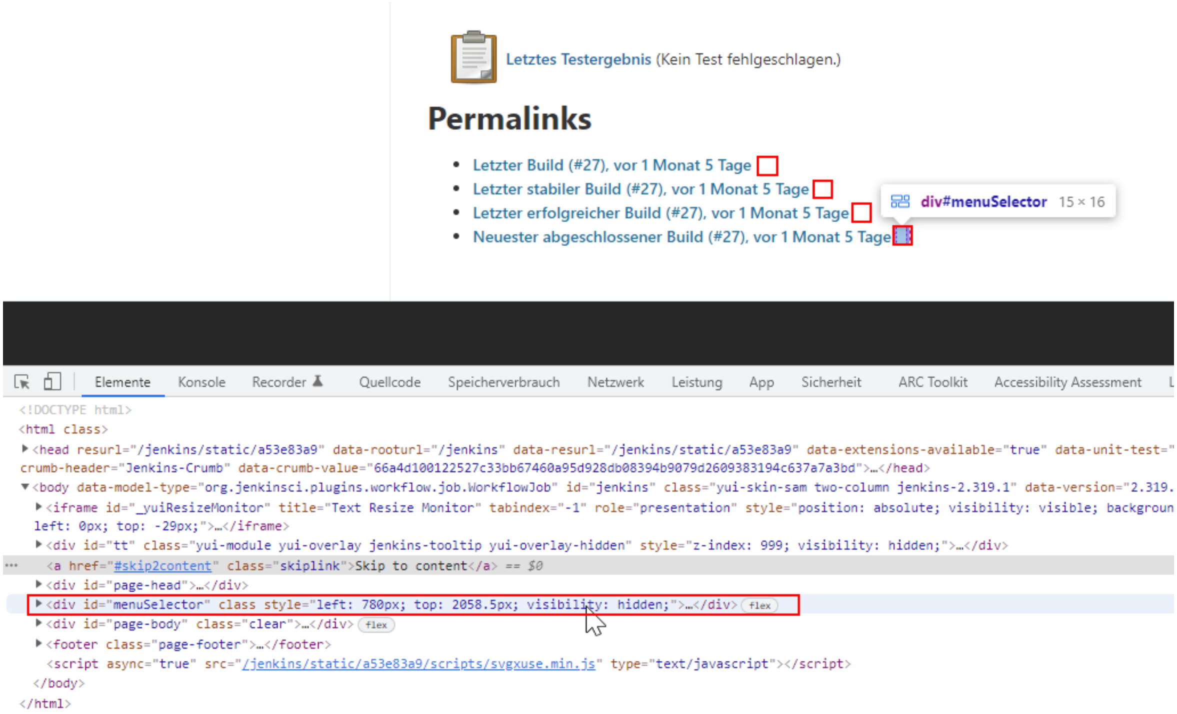


Figure 2.12: Context menus within the breadcrumb only accessible via tooltip

- At one point on the branch page, the menu selectors are hidden even though they are there, as hovering brings to view.



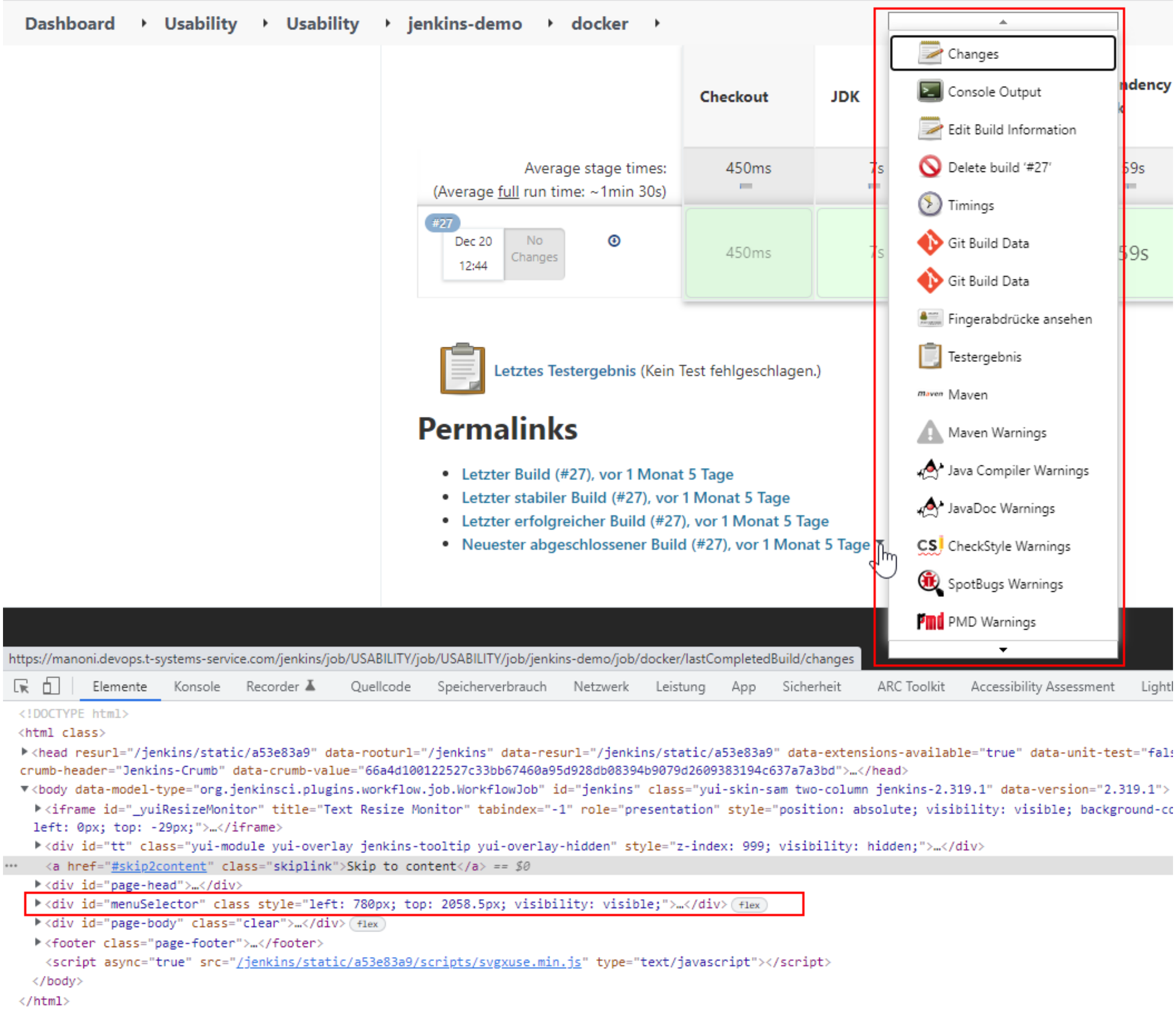
Letztes Testergebnis (Kein Test fehlgeschlagen.)

Permalinks

- Letzter Build (#27), vor 1 Monat 5 Tage
- Letzter stabiler Build (#27), vor 1 Monat 5 Tage
- Letzter erfolgreicher Build (#27), vor 1 Monat 5 Tage
- Neuester abgeschlossener Build (#27), vor 1 Monat 5 Tage

```
<!DOCTYPE html>
<html class>
 ▶<head resurl="/jenkins/static/a53e83a9" data-rooturl="/jenkins" data-resurl="/jenkins/static/a53e83a9" data-extensions-available="true" data-unit-test="
 crumb-header="Jenkins-Crumb" data-crumb-value="66a4d100122527c33bb67460a95d928db08394b9079d2609383194c637a7a3bd">…</head>
 ▼<body data-model-type="org.jenkinsci.plugins.workflow.job.WorkflowJob" id="jenkins" class="yui-skin-sam two-column jenkins-2.319.1" data-version="2.319.
   ▶<iframe id="_yuiResizeMonitor" title="Text Resize Monitor" tabindex="-1" role="presentation" style="position: absolute; visibility: visible; backgroun
   left: 0px; top: -29px;">…</iframe>
   ▶<div id="tt" class="yui-module yui-overlay jenkins-tooltip yui-overlay-hidden" style="z-index: 999; visibility: hidden;">…</div>
…    <a href="#skip2content" class="skiplink">Skip to content</a> == $0
   ▶<div id="page-head">…</div>
   ▶<div id="menuSelector" class style="left: 780px; top: 2058.5px; visibility: hidden;">…</div> flex
   ▶<div id="page-body" class="clear">…</div> flex
   ▶<footer class="page-footer">…</footer>
    <script async="true" src="/jenkins/static/a53e83a9/scripts/svgxuse.min.js" type="text/javascript"></script>
  </body>
</html>
```

Figure 2.13: Menu selectors are not visible…



Letztes Testergebnis (Kein Test fehlgeschlagen.)

Permalinks

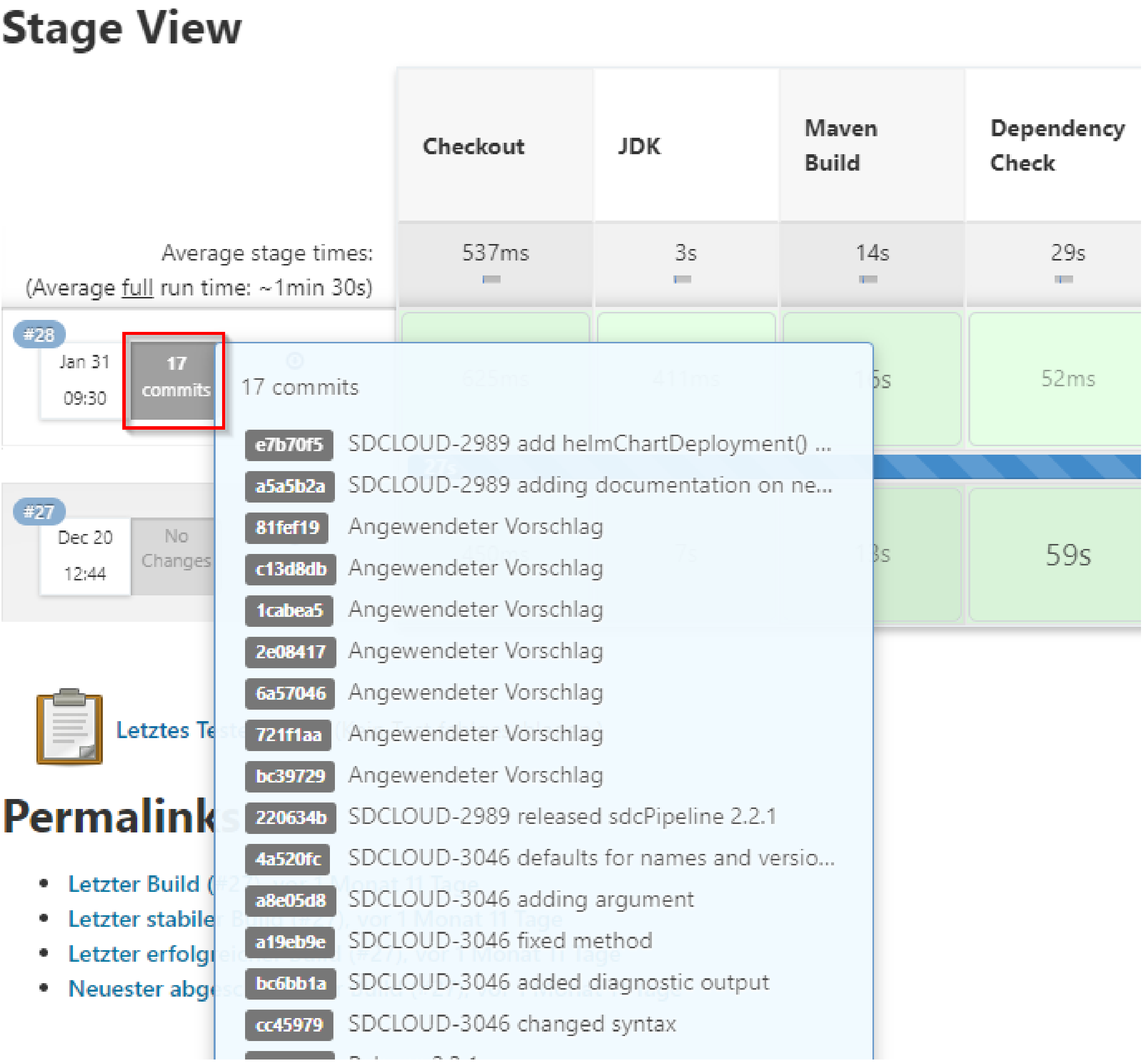
- Letzter Build (#27), vor 1 Monat 5 Tage
- Letzter stabiler Build (#27), vor 1 Monat 5 Tage
- Letzter erfolgreicher Build (#27), vor 1 Monat 5 Tage
- Neuester abgeschlossener Build (#27), vor 1 Monat 5 Tage

https://manoni.devops.t-systems-service.com/jenkins/job/USABILITY/job/USABILITY/job/jenkins-demo/job/docker/lastCompletedBuild/changes

```
<!DOCTYPE html>
<html class>
 ▶<head resurl="/jenkins/static/a53e83a9" data-rooturl="/jenkins" data-resurl="/jenkins/static/a53e83a9" data-extensions-available="true" data-unit-test="fal
 crumb-header="Jenkins-Crumb" data-crumb-value="66a4d100122527c33bb67460a95d928db08394b9079d2609383194c637a7a3bd">…</head>
 ▼<body data-model-type="org.jenkinsci.plugins.workflow.job.WorkflowJob" id="jenkins" class="yui-skin-sam two-column jenkins-2.319.1" data-version="2.319.1">
   ▶<iframe id="_yuiResizeMonitor" title="Text Resize Monitor" tabindex="-1" role="presentation" style="position: absolute; visibility: visible; background-c
   left: 0px; top: -29px;">…</iframe>
   ▶<div id="tt" class="yui-module yui-overlay jenkins-tooltip yui-overlay-hidden" style="z-index: 999; visibility: hidden;">…</div>
…    <a href="#skip2content" class="skiplink">Skip to content</a> == $0
   ▶<div id="page-head">…</div>
   ▶<div id="menuSelector" class style="left: 780px; top: 2058.5px; visibility: visible;">…</div> flex
   ▶<div id="page-body" class="clear">…</div> flex
   ▶<footer class="page-footer">…</footer>
    <script async="true" src="/jenkins/static/a53e83a9/scripts/svgxuse.min.js" type="text/javascript"></script>
  </body>
</html>
```

Figure 2.14 …but can be operated with the mouse and display a context menu

- In the Stage View, the list of commits can only be visualized as a tool tip using the mouse:



Stage View

	Checkout	JDK	Maven Build	Dependency Check
Average stage times: (Average full run time: ~1min 30s)	537ms	3s	14s	29s
#28 Jan 31 09:30 17 commits				52ms
#27 Dec 20 12:44 No Changes				59s

17 commits

e7b70f5 SDCLOUD-2989 add helmChartDeployment() ...
a5a5b2a SDCLOUD-2989 adding documentation on ne...
81fef19 Angewendeter Vorschlag
c13d8db Angewendeter Vorschlag
1cabea5 Angewendeter Vorschlag
2e08417 Angewendeter Vorschlag
6a57046 Angewendeter Vorschlag
721f1aa Angewendeter Vorschlag
bc39729 Angewendeter Vorschlag
220634b SDCLOUD-2989 released sdcPipeline 2.2.1
4a520fc SDCLOUD-3046 defaults for names and versio...
a8e05d8 SDCLOUD-3046 adding argument
a19eb9e SDCLOUD-3046 fixed method
bc6bb1a SDCLOUD-3046 added diagnostic output
cc45979 SDCLOUD-3046 changed syntax

Figure 2.15 Overview of commits only accessible via tooltip

! The operation of an application should be enabled device-independent. This means that all UI elements must be operable with both the mouse and the keyboard.

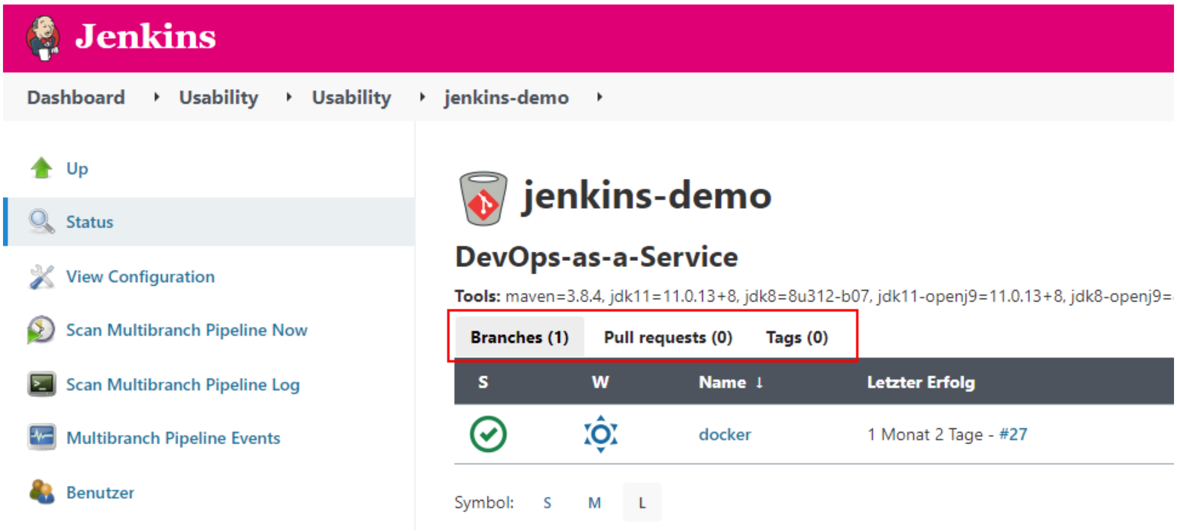
! If individual elements only have a mouseover event, they cannot be operated using the keyboard.

→ All UI elements that can be operated with the mouse must also be accessible with the keyboard. Corresponding events for keyboard operation may also have to be added for this purpose. In addition, the focus management must be adjusted so that the focus order corresponds to the order of operation.

context	In general, see examples
criteria	2.1.1 Keyboard Usability
user groups	blind | motor impaired
category	hurdle

Result 5. Some content is unusually operable for keyboard users.

On the overview page for the branches within a repository, various contents are displayed in a table below a tab register structure. Navigation is done exclusively with the tab key, which means that keyboard users have to navigate through all tab registers to get to the content in the tab panels. This way of navigating is not efficient.



jenkins-demo

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=

S	W	Name ↓	Letzter Erfolg
✓		docker	1 Monat 2 Tage - #27

Figure 2.16: Unusual keyboard navigation between tabs

! The tab registers are usually operated with the keyboard in such a way that the first register is jumped to with the tabulator key, navigation between the tab registers is carried out with the arrow keys, while changing to the associated tab panel with the tabulator key button is done. This allows efficient navigation between the tab registers and the corresponding tab panels and the tab order is consistent.

Note: Screen reader users cannot perceive the roles of the tab registers correctly, as the implementation uses input fields of type "Radio" with integrated links. See also result 9.

→ For a barrier-free implementation of tab registers, both the roles, attributes and in particular the keyboard operation must be converted to tabs in accordance with the WAI ARIA Authoring Practices.[3]

context	Usability test project: Dashboard > Usability folder > Usability project > Jenkins-demo repository > Tab register
criteria	2.4.3 Focus Order
user groups	blind | motor impaired
category	impairment

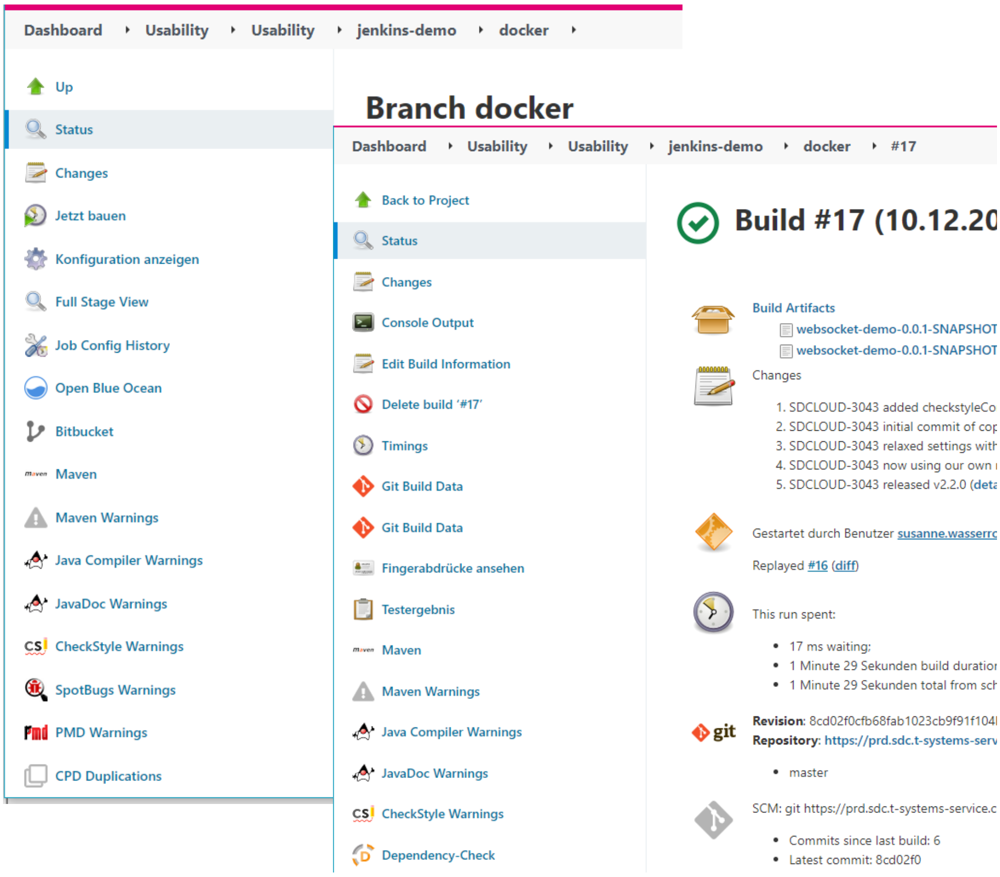
[3] See details at: https://www.w3.org/TR/wai-aria-practices-1.1/examples/tabs/tabs-2/tabs.html

Result 6. Orientation and navigation in the application are more difficult.

Within the application, users can easily lose their bearings, as the usability study also showed. (Details can also be found in the usability report in result 1, where the various reasons are explained in more detail.)

!From the point of view of accessibility, two aspects are decisive:

- Headings that don't follow a clear convention and are therefore not meaningful because they
  - on the one hand are either dependent on the content and without an addition to refer to the respective level, e.g. B. "Folder name>", "<Project name>", "<Repository name>" - these can also be the same, which can contribute to irritation
  - on the other hand, they are fixed without a reference to the context or the level (here: build), e.g. B. "Console Output"
  - or the heading as an addition, the respective level is listed for orientation, e.g. B. "Branch <branch name>".
- the non-uniformly structured menu, which does not separate general functions from specific options of the different levels and thus becomes confusing.



1. SDCLOUD-3043 added checkstyleCo
2. SDCLOUD-3043 initial commit of cop
3. SDCLOUD-3043 relaxed settings witl
4. SDCLOUD-3043 now using our own
5. SDCLOUD-3043 released v2.2.0 (deta

Gestartet durch Benutzer susanne.wasserrc

Replayed #16 (diff)

This run spent:

- 17 ms waiting;
- 1 Minute 29 Sekunden build duratior
- 1 Minute 29 Sekunden total from sch

Revision: 8cd02f0cfb68fab1023cb9f91f104l
Repository: https://prd.sdc.t-systems-serv

- master

SCM: git https://prd.sdc.t-systems-service.c

- Commits since last build: 6
- Latest commit: 8cd02f0

Figure 2.17: Confusing navigation menu (here: branch level vs. build level)

✓ The path information proves to be helpful for orientation.

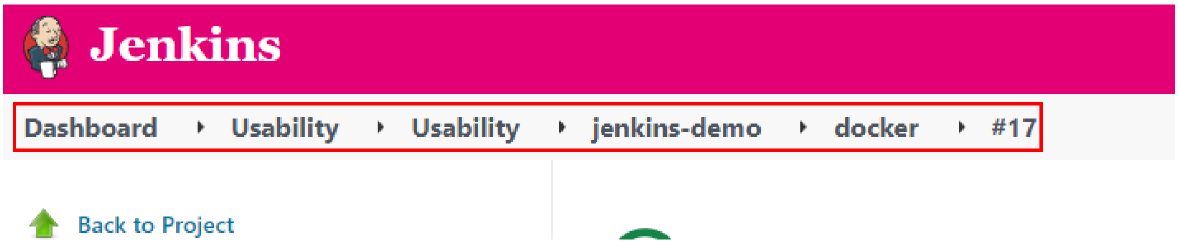


Figure 2.18: Positive: Path specification supports orientation

! However, orientation is also made more difficult if - as can be seen in the figure - content happens to have the same name.

! These problems make orientation and navigation considerably more difficult, especially for blind users who cannot use any visual orientation options, but who rely on the linear output of the screen reader, and represent an obstacle when using the application.

→ The headings should be clearer and better structured, e.g. B. by always naming the level first and then the description of the content.

→ The menus on the left should be better structured and designed more clearly (see also result 2 in the usability report for further details).

context	General, left-side navigation menu
criteria	3.2.3 Consistent Navigation 2.4.6 Descriptions
user groups	blind people
category	hurdle

Result 7. The focus order is not logical in some places.

On the "Settings" page in the user profile and on the "Configure" page, help icons are offered for many input fields, which provide more detailed information on the fields. These icons are at the top of the focus order and are jumped to one after the other, regardless of the associated input fields when navigating with the keyboard. This means that there is no connection to the corresponding form fields and blind users in particular cannot establish a connection between the icons and the form fields.

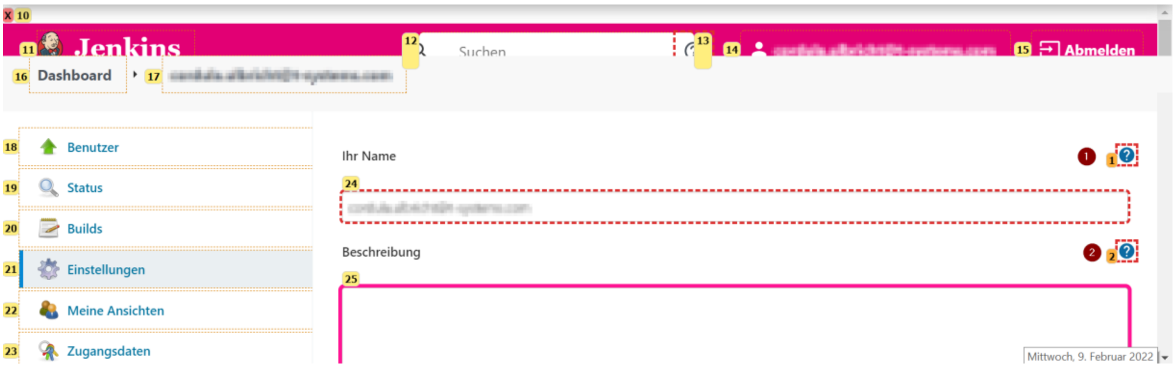


Figure 2.19: Help icons are at the beginning of the focus order (1/2) (Example: Personal settings page)

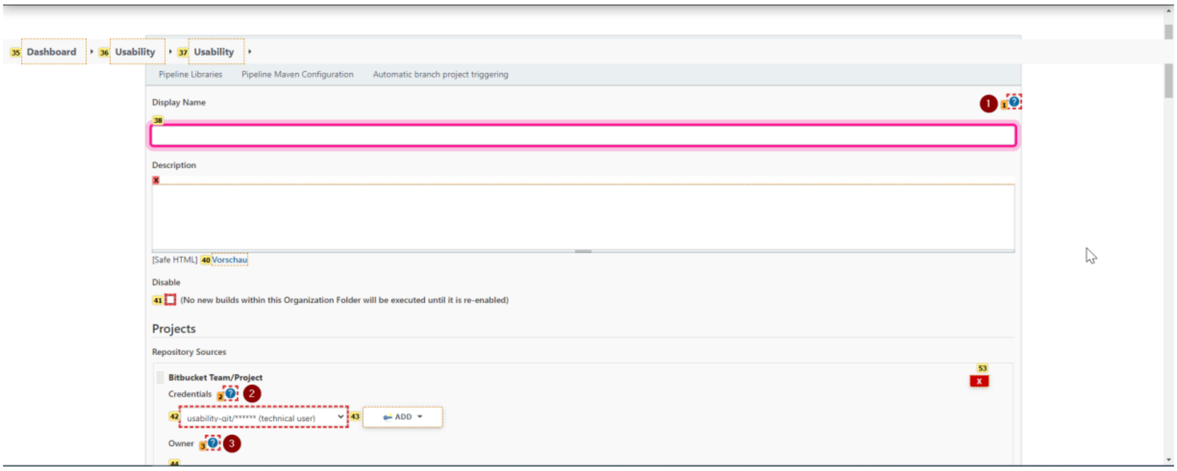

Dashboard
Usability
Usability
Pipeline Libraries
Pipeline Maven Configuration
Automatic branch project triggering
Display Name
Description
[Safe HTML] Vorschau
Disable
(No new builds within this Organization Folder will be executed until it is re-enabled)
Projects
Repository Sources
Bitbucket Team/Project
Credentials
usability-git/****** (technical user)
ADD
Owner

Figure 2.20: Help icons are at the beginning of the focus order (2/2) (Example: Configure page)

! A coherent focus order is imperative so that keyboard users and screen reader users can navigate within the application in a comprehensible manner.

→ The focus order on the "Settings" pages below the user profile and "Configure" needs to be revised so that the help icons are jumped to immediately after the form elements to which they are assigned.

context	User Profile > Settings Test project Usability: Dashboard > Usability folder > Usability project > Configure
criteria	2.4.3 Focus Order
user groups	blind | motor impaired
category	hurdle

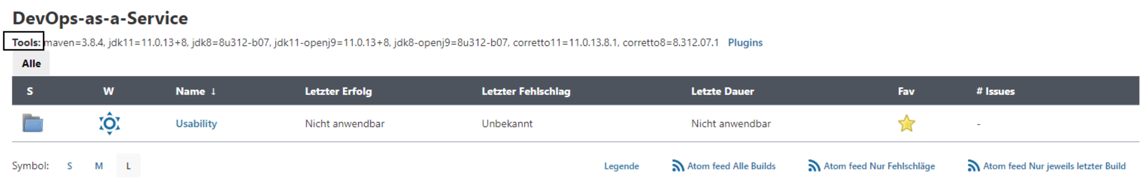
2.2 Semantic Labeling of UI Elements

Finding 8. Individual visual headings are not semantically structured.

✓ Most of the existing visual headings are also semantically marked as such.

On all pages on which the list of tools used is given with the respective version numbers, the heading "Tools" is only visually marked.

! This means that the content cannot be structurally understood by blind users and may not be noticed.



DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

Alle

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Fav	# Issues
		Usability	Nicht anwendbar	Unbekannt	Nicht anwendbar	☆	-

Symbol: S M L

Legende · Atom feed Alle Builds · Atom feed Nur Fehlschläge · Atom feed Nur jeweils letzter Build

Figure 2.21: Visual headline not semantically structured

! Thanks to the visual structuring of the headings in the application, the sighted user knows what belongs together, can easily survey the content of the website and access it in a targeted manner. Blind users (or users using magnification software) rely on the structure being accessible and usable regardless of what is displayed on the screen. The use of heading elements is an essential prerequisite for this.

→ The heading structure on the main pages should be checked and corrected. Attention should be paid to the marking of all visual headings and the correct nesting of the elements <h1> to <h6>.

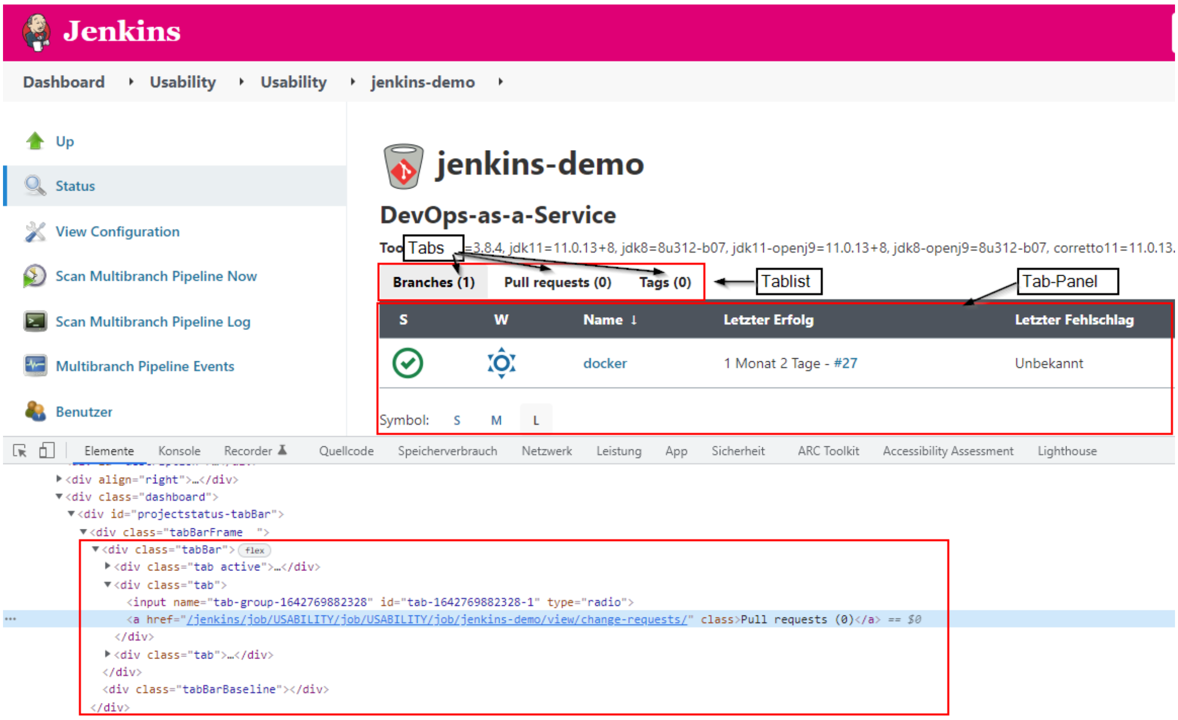
→ The "Tools" heading should be marked with the <h> element on all pages according to the hierarchy.

context	General > Headings
criteria	1.3.1 Information and Relationships
user groups	blind people
category	impairment

Result 9. Tabs cannot be perceived as such by the blind.

The tabs on the overview page for the branches are not perceptible as such by screen reader users.

! The reason is that instead of the correct roles to be defined with ARIA, input fields of the "Radio" type with integrated links are used. Screen reader users therefore have a different idea of the structure of the information presented and may not be able to perceive it correctly. Keyboard operation is also different than usual for register navigation. See also result 5.



S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag
✓		docker	1 Monat 2 Tage - #27	Unbekannt

```
▶<div align="right">…</div>
▼<div class="dashboard">
  ▼<div id="projectstatus-tabBar">
    ▼<div class="tabBarFrame  ">
      ▼<div class="tabBar"> flex
        ▶<div class="tab active">…</div>
        ▼<div class="tab">
           <input name="tab-group-1642769882328" id="tab-1642769882328-1" type="radio">
           <a href="/jenkins/job/USABILITY/job/USABILITY/job/jenkins-demo/view/change-requests/" class>Pull requests (0)</a> == $0
         </div>
        ▶<div class="tab">…</div>
       </div>
       <div class="tabBarBaseline"></div>
     </div>
```

Figure 2.22: Correct roles for tabs are missing

! Note: Tab registers also exist on other pages, but usually only with one tab. Here, too, implementation with the appropriate roles would make sense so that screen reader users benefit from uniform navigation within tab registers.

→ For a barrier-free implementation of tab registers, both the roles, attributes and in particular the keyboard operation must be converted to tabs in accordance with the WAI ARIA Authoring Practices.[3]See also result 5.

context	Usability test project: Dashboard > Usability folder > Usability project > Jenkins-demo repository > docker branch
criteria	4.1.2 Name, Role, Value
user groups	blind people
category	impairment

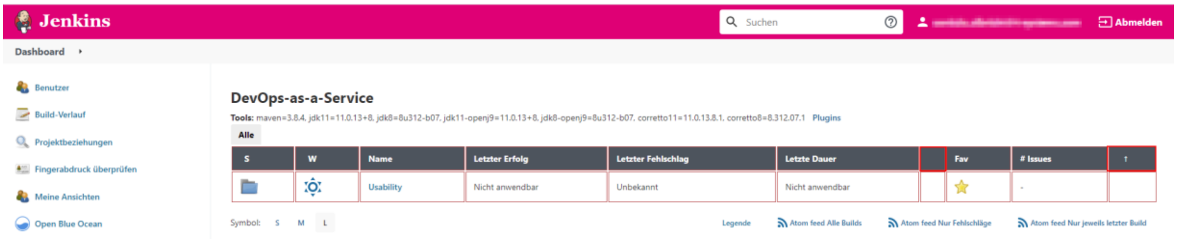
Result 10. Table contents can partly. are not correctly perceived.

✓ The semantic structure of the main table on all pages is complete and can be well perceived.

In some places, however, not all table columns of the main table are labeled. This makes orientation and navigation within the tables more difficult, especially for blind users. You can only work out by reading the contents - and the lack of corresponding table contents for the empty column headings - that the table is not completely filled.

! But a complete labeling of all existing columns is also very helpful for users with normal vision, even if there is no content in individual table cells in certain views/ situations. Otherwise, these columns could also be hidden. However, a consistent display – also of empty columns, but with column labels – is to be preferred.

On the following pages, individual column labels are missing within the displayed table:

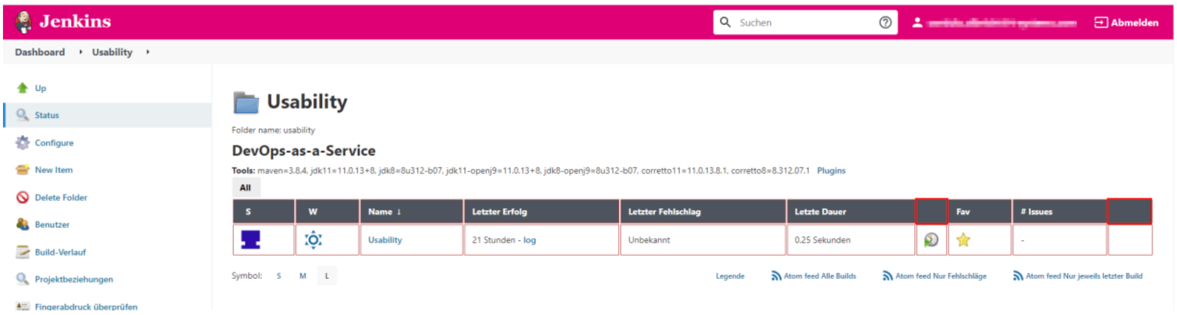


DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

S	W	Name	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer		Fav	# Issues	↑
		Usability	Nicht anwendbar	Unbekannt	Nicht anwendbar		★	-	

Figure 2.23: Missing column label (1/3) (Example: Dashboard > Table)



Usability

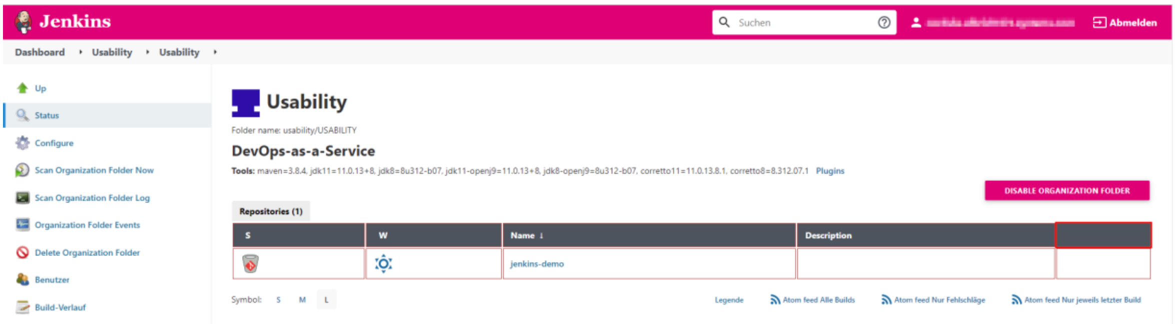
Folder name: usability

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer		Fav	# Issues	
		Usability	21 Stunden - log	Unbekannt	0.25 Sekunden		★	-	

Figure 2.24: Missing column label (2/3) (Example: Test Project Usability: Dashboard > Usability folder > Table)


Jenkins
Suchen
[redacted]
Abmelden
Dashboard
Usability
Usability
Up
Status
Configure
Scan Organization Folder Now
Scan Organization Folder Log
Organization Folder Events
Delete Organization Folder
Benutzer
Build-Verlauf
DISABLE ORGANIZATION FOLDER
Repositories (1)
Symbol: S M L
Legende
Atom feed Alle Builds
Atom feed Nur Fehlschläge
Atom feed Nur jeweils letzter Build

Usability

Folder name: usability/USABILITY

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

S	W	Name ↓	Description	
		jenkins-demo		

Figure 2.25: Missing column label (3/3) (Example: Dashboard > Usability folder > Usability project > Table)

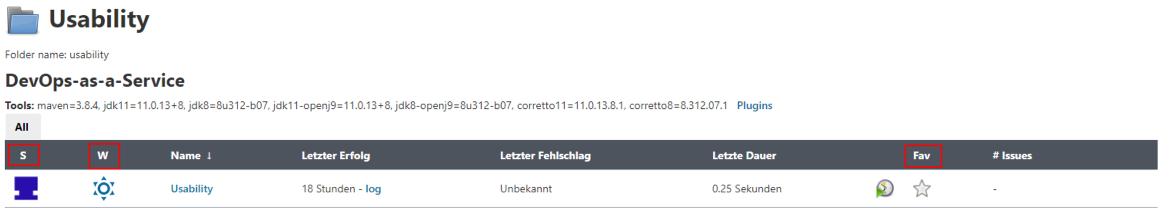
! Visually oriented people use the value range as well as the headings for orientation in a data table. It is therefore relatively easy for them to recognize structural defects, such as changes in the meaning of rows or columns, and to deal with them. Visually impaired and blind users, on the other hand, access the data tables more analytically. They develop an idea of the structure of the table based on the headings and other information available in the context. This idea is the basis for accessing the data offered.

→ It is recommended that all column headings be labeled.

→ If there is a comprehensible reason why the column names are not assigned, blind users can alternatively also use corresponding visual names

Hidden information in the column headings is added, which is pushed into the invisible area with CSS or reduced to 1×1 pixel and is not visible to sighted users. This allows blind users to better orientate themselves within the table.

In the tables shown above, individual columns are also not meaningfully named, this applies to the columns "S", "W" and "Fav".



Usability

Folder name: usability

DevOps-as-a-Service

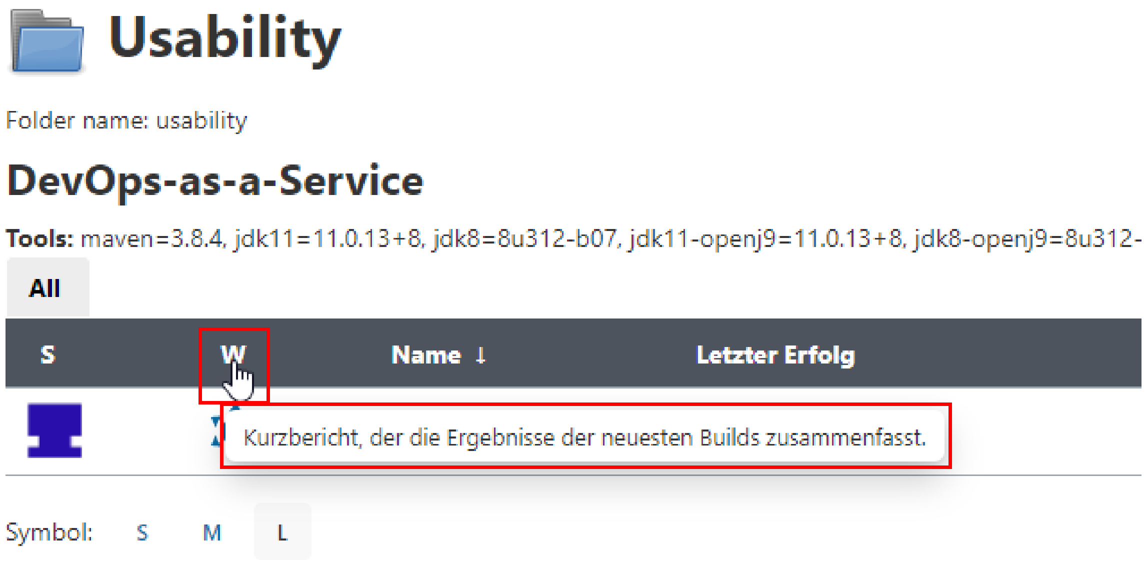
Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

All

S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer		Fav	# Issues
		Usability	18 Stunden - log	Unbekannt	0.25 Sekunden		☆	-

Figure 2.26: Abbreviated, non-self-descriptive column headings (Example: Dashboard > Usability folder > Usability project > Tabel)

✓ For some (not all) abbreviations, explanations are displayed via tooltip, as shown in the following figure.



Usability

Folder name: usability

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-

All

S	W	Name ↓	Letzter Erfolg

Kurzbericht, der die Ergebnisse der neuesten Builds zusammenfasst.

Figure 2.27: Explanation of "W" displayed on mouse-over (Example: Dashboard > Usability folder > Usability project > Table)

However, it is still not clear from this why "Brief report summarizing the results of the latest build" is abbreviated to "W".

! As the usability study revealed, even experienced users do not know what these abbreviations mean.

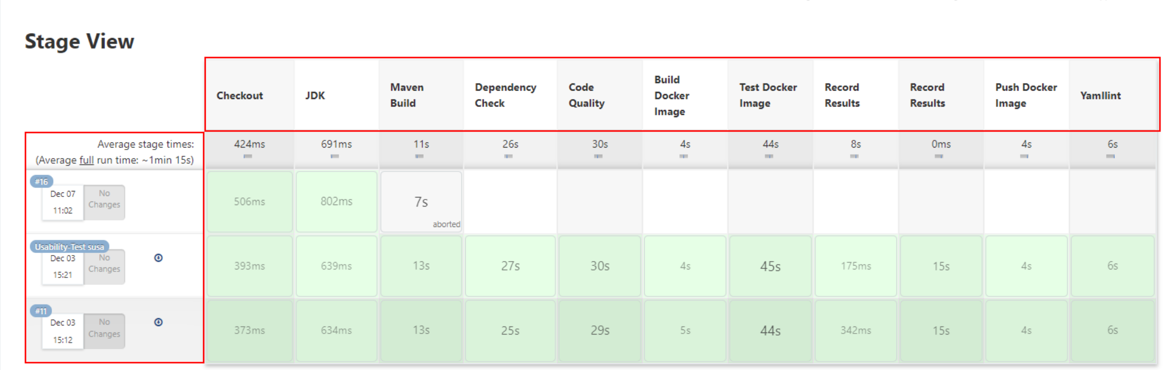
! Abbreviations should be avoided, especially when there is enough space for full names.

! If tooltips are shown to explain, they should also explain how the abbreviation is derived so that users can more easily remember the meaning.

! It must also be ensured that tooltips are also accessible to users with motor disabilities, i.e. they can also be operated with the keyboard.

The stage view table within the branch view is also not easy for blind users to understand. While the individual stages are correctly marked as headings, the entries in the first column for the respective rows are headings, since the data per stage is shown in the table for each build. The table thus has both column headings (for the individual stages) and row headings (for the individual builds).

This structure is not mapped within the table, making it difficult for blind users to grasp the table structure.



Stage View

	Checkout	JDK	Maven Build	Dependency Check	Code Quality	Build Docker Image	Test Docker Image	Record Results	Record Results	Push Docker Image	Yamllint
Average stage times: (Average full run time: ~1min 15s)	424ms	691ms	11s	26s	30s	4s	44s	8s	0ms	4s	6s
#16 Dec 07 11:02 No Changes	506ms	802ms	7s aborted								
Usability-Test susa Dec 03 15:21 No Changes	393ms	639ms	13s	27s	30s	4s	45s	175ms	15s	4s	6s
#11 Dec 03 15:12 No Changes	373ms	634ms	13s	25s	29s	5s	44s	342ms	15s	4s	6s

Figure 2.28: Missing headline markup (Example: Dashboard > Usability folder > Usability project > jenkins-demo" > Branch "docker", Branch View Table Stage View)

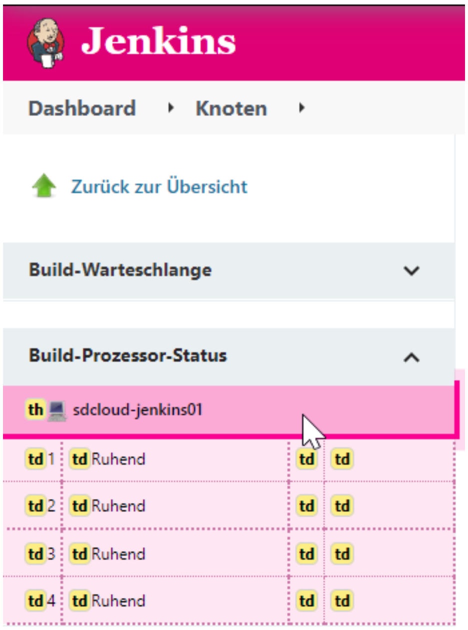
→ All table cells that represent a heading for a group of cells must be marked with <th> and an additional scope attribute. In the header row, scope="col" associates each header cell with each data cell in the corresponding column, while in the header column, scope="row" associates each header cell with each data cell in the corresponding row.[4]

→ The empty cell in the first column/row is treated as an empty data cell (<td></td>).

Elsewhere, the structure of the build processor status table cannot be perceived correctly.

! Structure elements are used for data tables, although it appears to be a layout table. This is indicated by the missing column headings. The visual heading (also a link) is marked with a <th> element, which should only be used for one column or one row. Here the heading seems to have more of the function of a table heading, which should then be marked with <caption> instead. The two empty columns also indicate that a tabular layout is the goal of using the table structure elements.

[4] Details can be found, for example, in the WAI tutorial on tables:https://www.w3.org/WAI/tutorials/tables/two-headers/



th sdcloud-jenkins01			
td 1	td Ruhend	td	td
td 2	td Ruhend	td	td
td 3	td Ruhend	td	td
td 4	td Ruhend	td	td

Figure 2.29: Structure markup used for layout table (Example: Dashboard > Usability folder > Usability project > Table)

→ It should be checked whether only a tabular layout is actually desired at this point to present the data. The presentation of a data table does not seem necessary at this point. In this case, the entire table should be hidden from screen reader users with role="presentation" and the <th> element for the visible heading should be removed.

→ Otherwise, if the information is to be presented as a data table, all columns should be provided with <th> elements and appropriate labels. The "sdcloud-jenkins01" link should then be marked with <caption> as the table header.

→ Layout tables should generally be marked with role="presentation". This flag hides the table structure for screen reader users.

context	Usability Test Project: Dashboard > Usability Folder > Usability Project > Table on all subpages with empty column headers Usability Test Project: Dashboard > Usability Folder > Usability Project > Repository "jenkins-demo" > Branch "docker", Branch View Table Stage View Usability test project: Dashboard > Usability folder > Usability project > jenkins-demo repository > #27 Test Project Usability: Dashboard > Build Processor Status table in left side menu
criteria	1.3.1 Information and Relationships 2.4.6 Descriptions
user groups	blind people
category	hurdle

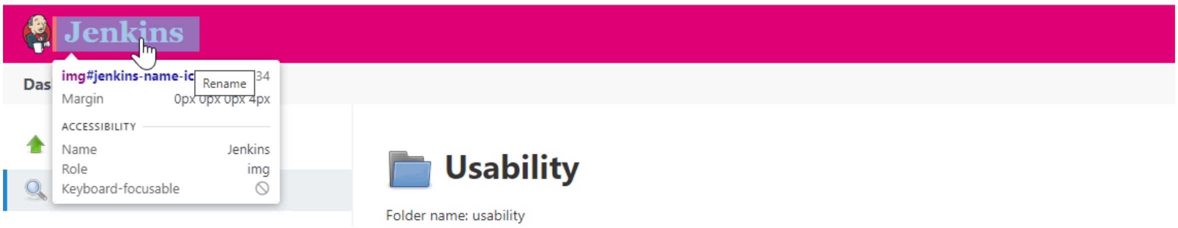
2.3 Labeling of UI Elements

Finding 11. Many linked UI elements are not clearly identified.

Many linked UI elements are not labeled accessible, so they are not clearly perceptible to screen reader users. These are mostly linked graphics.

The following examples stood out:

- The font graphic "Jenkins" in the header is only assigned the alternative text "Jenkins", which does not clearly identify the link target, since the link to the home page is not communicated.



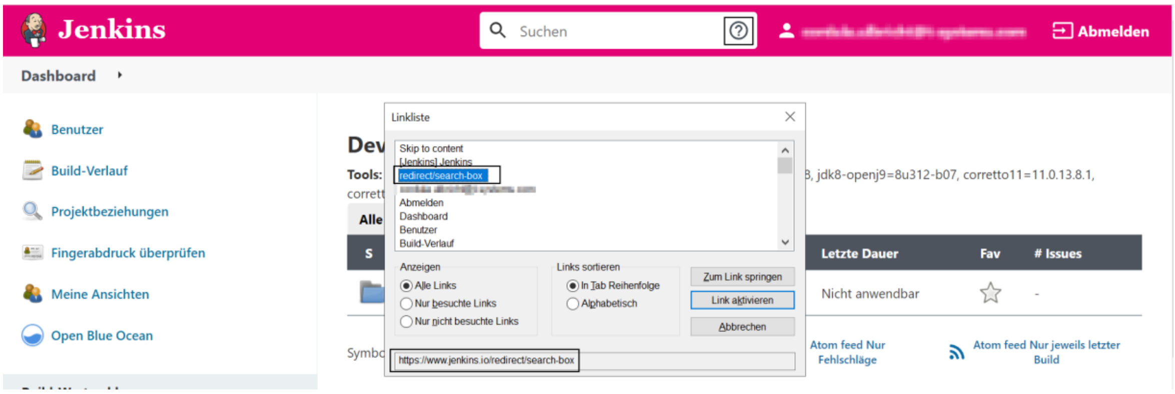
img#jenkins-name-ic … 34
Margin 0px 0px 0px 4px
ACCESSIBILITY
Name: Jenkins
Role: img
Keyboard-focusable: ⃠

Figure 2.30: Linked graphic not meaningfully named, example: Font graphic “Jenkins” in the header

→ In the linked graphic in the header, the link target should be correctly specified as "Jenkins Home".

- The help icon within the prominent search field in the header lacks a clear name.

!The help icon is a linked svg graphic designed for screen reader
Users with "redirect/search-box" is issued. This is not a meaningful link name.



Linkliste
Skip to content
[Jenkins] Jenkins
redirect/search-box
[redacted]
Abmelden
Dashboard
Benutzer
Build-Verlauf

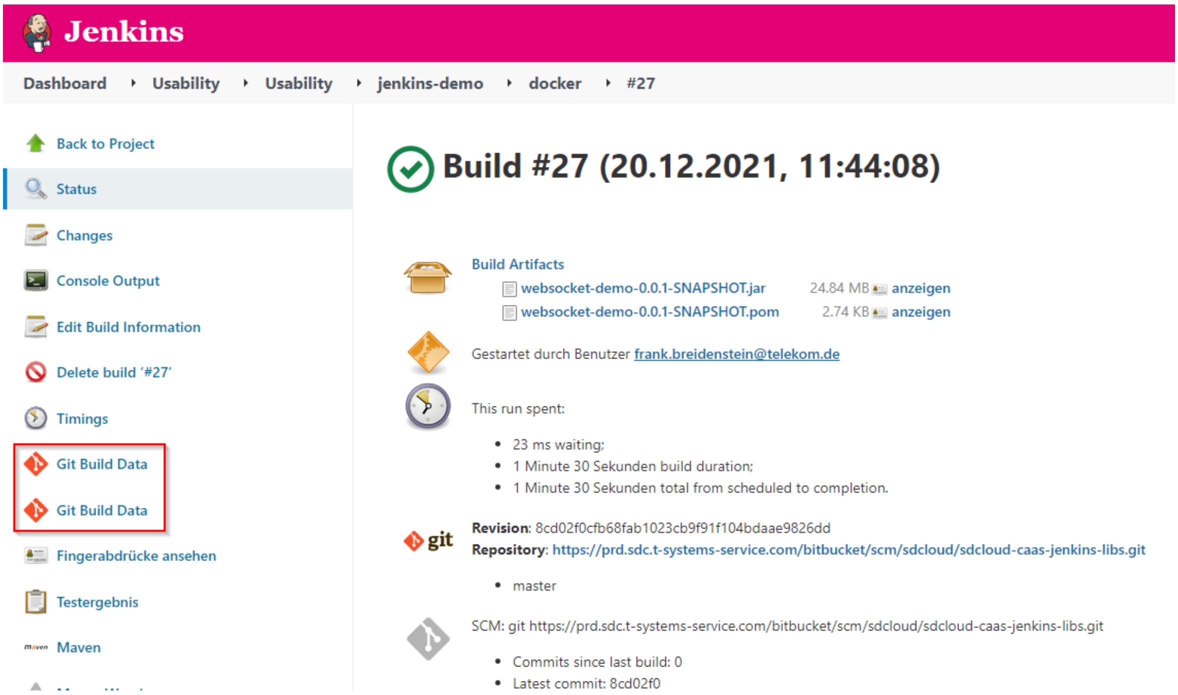
Anzeigen: ● Alle Links ○ Nur besuchte Links ○ Nur nicht besuchte Links
Links sortieren: ● In Tab Reihenfolge ○ Alphabetisch

https://www.jenkins.io/redirect/search-box

Figure 2.31: Linked graphic not clearly labeled, example: Help icon in the search field

→ A link name must be assigned that clearly identifies the link target, e.g. B. "Information about the search field".

- The link name "Git Build Data" is used several times, but has different link targets.



Jenkins

Dashboard › Usability › Usability › jenkins-demo › docker › #27

- Back to Project
- Status
- Changes
- Console Output
- Edit Build Information
- Delete build '#27'
- Timings
- Git Build Data
- Git Build Data
- Fingerabdrücke ansehen
- Testergebnis
- Maven

Build #27 (20.12.2021, 11:44:08)

Build Artifacts

websocket-demo-0.0.1-SNAPSHOT.jar	24.84 MB	anzeigen
websocket-demo-0.0.1-SNAPSHOT.pom	2.74 KB	anzeigen

Gestartet durch Benutzer frank.breidenstein@telekom.de

This run spent:

- 23 ms waiting;
- 1 Minute 30 Sekunden build duration;
- 1 Minute 30 Sekunden total from scheduled to completion.

Revision: 8cd02f0cfb68fab1023cb9f91f104bdaae9826dd
Repository: https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-caas-jenkins-libs.git

- master

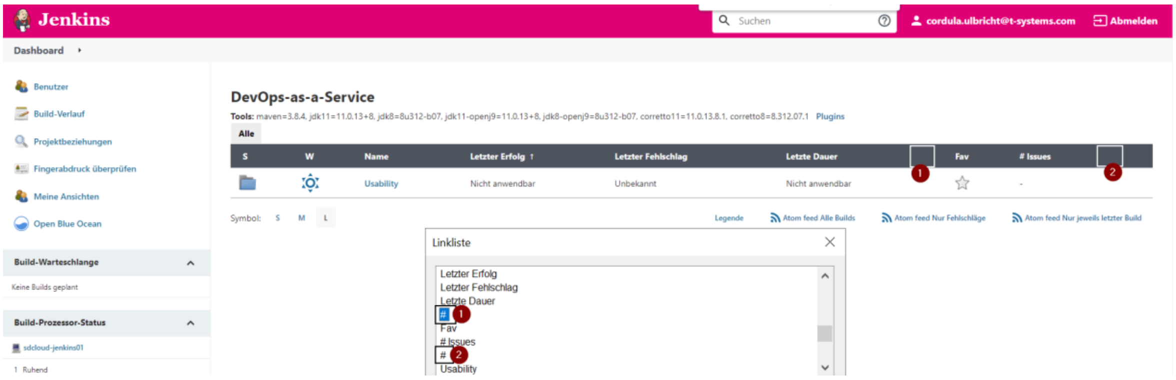
SCM: git https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-caas-jenkins-libs.git

- Commits since last build: 0
- Latest commit: 8cd02f0

Figure 2.32: Ambiguous link label in the menu (example: build page)

→ Duplicate link names should be avoided. A link name must be assigned that clearly identifies the link target, e.g. For example, Git Build Data - Master Branch and Git Build Data - Docker Branch.

- Within the tables there are one or more empty columns without column headings, but each has a link behind it. At these points, only "#" is announced for screen reader users.



Jenkins Suchen cordula.ulbricht@t-systems.com Abmelden

Dashboard ›

- Benutzer
- Build-Verlauf
- Projektbeziehungen
- Fingerabdruck überprüfen
- Meine Ansichten
- Open Blue Ocean

Build-Warteschlange

Keine Builds geplant

Build-Prozessor-Status

sdcloud-jenkins01

1 Ruhend

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

Alle

S	W	Name	Letzter Erfolg ↑	Letzter Fehlschlag	Letzte Dauer	1	Fav	# Issues	2
		Usability	Nicht anwendbar	Unbekannt	Nicht anwendbar		☆	-	

Symbol: S M L   Legende   Atom feed Alle Builds   Atom feed Nur Fehlschläge   Atom feed Nur jeweils letzter Build

Linkliste

Letzter Erfolg
Letzter Fehlschlag
Letzte Dauer
1
Fav
Issues
2
Usability

Figure 2.33: Empty linked column headings: example project table

→ If these empty columns (in this view) are not required, they should be hidden dynamically so that screen reader users are not confused by missing information or incorrect structures. Otherwise the columns should be labeled correctly. See result 10 (table structure)

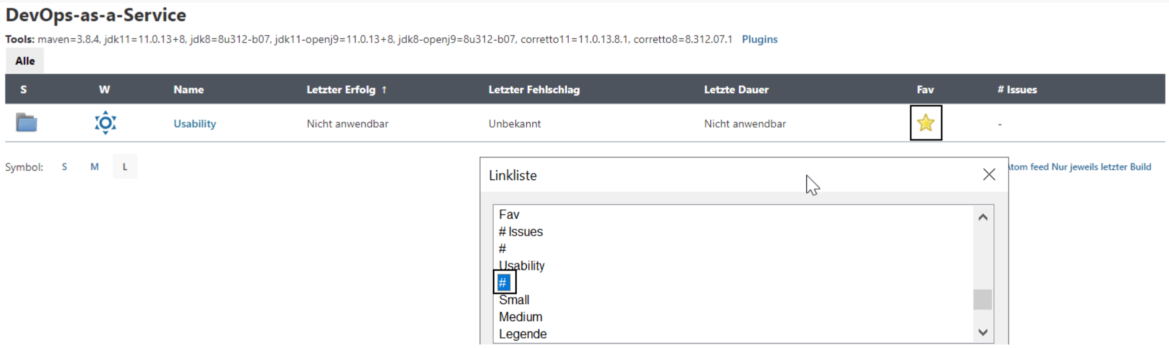
!Note: Descriptive column names are also helpful for sighted users rich and serve as a good orientation within the table.

- The sorting arrow within the column headings is not marked, "Arrow up" or "Arrow down" is displayed for screen reader users.

→ The sorting function is available for screen reader users with the help of the ARIA attributes aria-sort="ascending" or aria-sort="descending".[5]The linked graphic (the sorting arrow) itself is for screen reader users e.g. B. with the help of aria-hidden, since the sorting function is output via the aria-sort attribute.

→ To operate the sorting function, the column headings with role="button" should be given the role of a button to make it clear to users that a function is triggered and that the link will not take them to another page.

- The favorites icon, with which an entry can be made a favorite or this process can be undone, is not labeled. The link name is only displayed with "#" for screen reader users.



DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

Alle

S	W	Name	Letzter Erfolg ↑	Letzter Fehlschlag	Letzte Dauer	Fav	# Issues
		Usability	Nicht anwendbar	Unbekannt	Nicht anwendbar	☆	-

Symbol: S M L

Atom feed Nur jeweils letzter Build

Linkliste

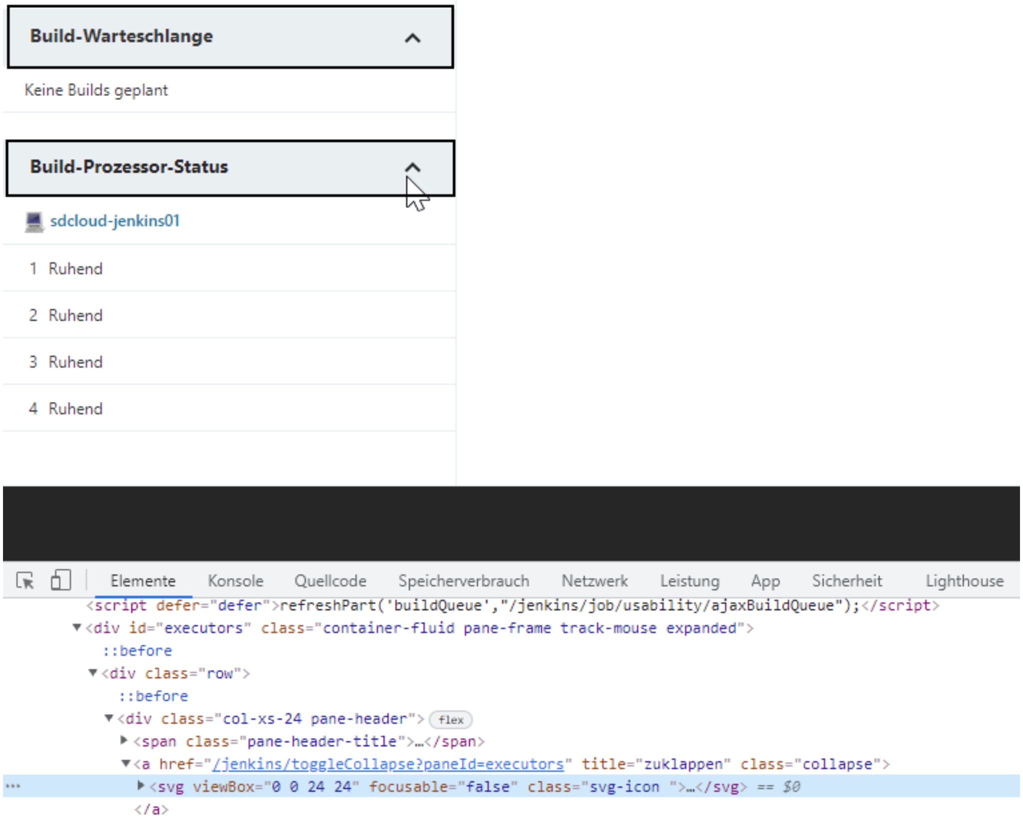
Fav
Issues
#
Usability
#
Small
Medium
Legende

Figure 2.34: Untitled favorites icon: example project table

→ The linked icon must be given a meaningful aria label, depending on the toggle state of the icon, e.g. B. "Add favorite" or "Remove favorite". Instead of a link, the icon should be marked as a button, since a function is executed with the icon.

- The linked icons for "collapsing" and "expanding" details in the lower area of the sidebar are not clearly labeled. It is not clear which area can be expanded or collapsed.

[5] Detailed information on sortable tables can be found at:https://dequeuniversity.com/library/aria/table-sortable as well as https://adrianroselli.com/2021/04/sortable-table-columns.html



Build-Warteschlange

Keine Builds geplant

Build-Prozessor-Status

sdcloud-jenkins01

1 Ruhend

2 Ruhend

3 Ruhend

4 Ruhend

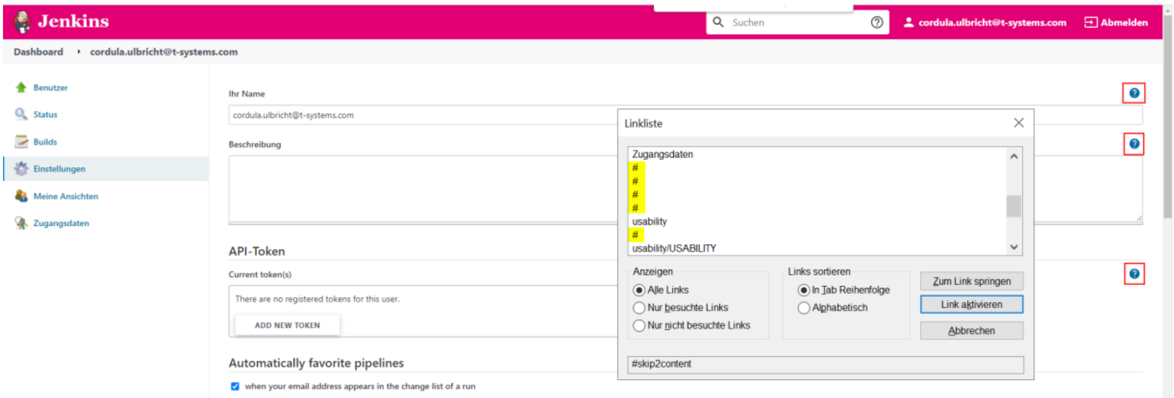
```
      <script defer="defer">refreshPart('buildQueue',"/jenkins/job/usability/ajaxBuildQueue");</script>
    ▼<div id="executors" class="container-fluid pane-frame track-mouse expanded">
        ::before
      ▼<div class="row">
          ::before
        ▼<div class="col-xs-24 pane-header"> flex
          ▶<span class="pane-header-title">…</span>
          ▼<a href="/jenkins/toggleCollapse?paneId=executors" title="zuklappen" class="collapse">
···         ▶<svg viewBox="0 0 24 24" focusable="false" class="svg-icon ">…</svg> == $0
            </a>
```

Figure 2.35: Linked icons for "Collapse" and "Expand" are not fully and correctly named

! The "Collapse" and "Expand" links lack a meaningful designation and the correct role and information about the fact that clicking on the link makes further entries visible or closes them again.

→ Since the links do not lead to another page, but perform a function, the correct role is "button", which must be conveyed either directly with the <button> element or with role="button". In order for the button name to be meaningful, the text "build queue" or "open build processor status" should be conveyed with an arialabel. The aria-expanded attribute indicates that additional content is displayed or hidden by confirming the button.

On the personal settings page, both the help icons and the favorites icons are not labeled with an accessible name, so only "#" signs are output for screen reader users.



Ihr Name: cordula.ulbricht@t-systems.com

Beschreibung

API-Token

Current token(s)

There are no registered tokens for this user.

Automatically favorite pipelines

☑ when your email address appears in the change list of a run

Zugangsdaten
#
#
#
#
usability
#
usability/USABILITY

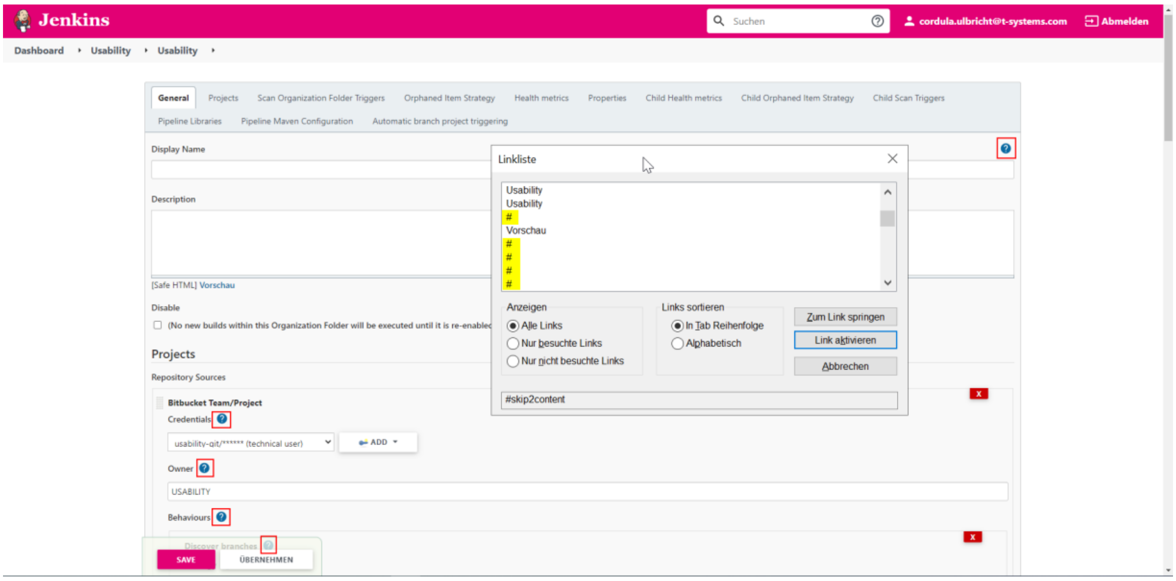
● Alle Links
○ Nur besuchte Links
○ Nur nicht besuchte Links

● In Tab Reihenfolge
○ Alphabetisch

#skip2content

Figure 2.36: Help icons and favorites icons are not labeled (Example: User Profile > Settings)

The names for the help icons are also missing on the "Configure" page.



Credentials: usability-git/****** (technical user)

Owner: USABILITY

Linkliste:
Usability
Usability
#
Vorschau
#
#
#
#

Anzeigen: ● Alle Links ○ Nur besuchte Links ○ Nur nicht besuchte Links

Links sortieren: ● In Tab Reihenfolge ○ Alphabetisch

#skip2content

Figure 2.37: Help icons are not labeled (Example: Test Project Usability: Dashboard > Folder "Usability" > Project "Usability" > Configour)

→ The help icons need accessible labels, which can be assigned using aria-label.

context	Header > Search Field > Help Icon Tables (on all pages where tables are displayed) > empty linked column headings Build page > left side menu > duplicate menu items tables > favorites icon Sidebar > Links to expand and collapse sections User menu > Settings > Help icons Usability test project: Dashboard > Usability folder > Usability project > Configure > Help Icons
criteria	2.4.4 Purpose of a link (in context) 4.1.2 Name, Role, Value
user groups	blind people
category	hurdle

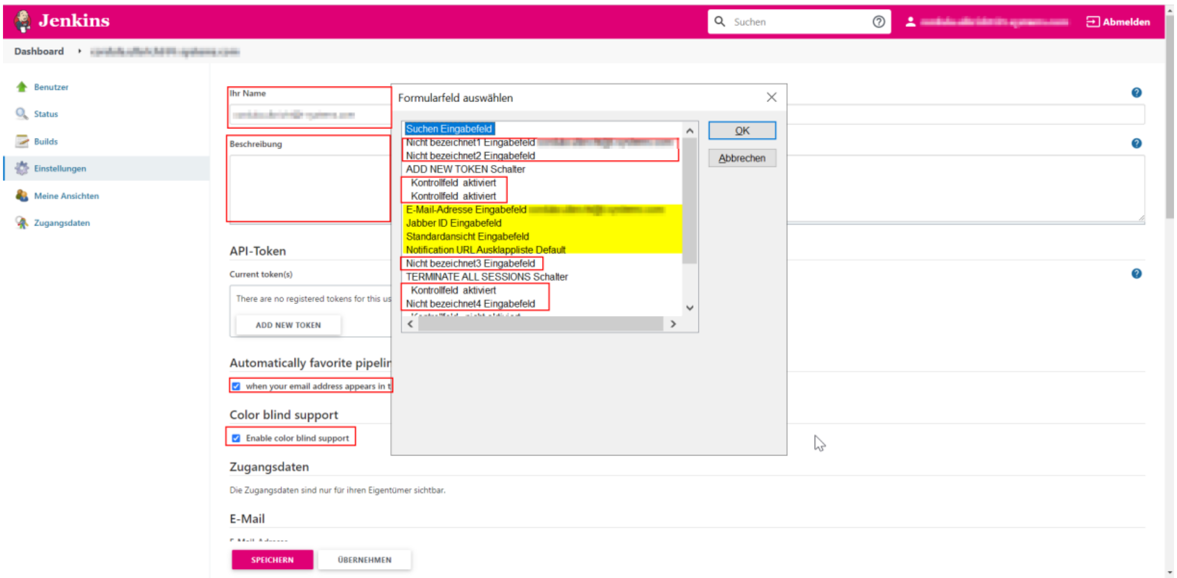
Result 12. Form captions are e.g. T. not programmatically determined.

In Jenkins, there are relatively few form elements apart from the search fields in the header and in the Build History table on the branch page and on the personal settings page in the user profile.

Within the personal settings, however, most of the labels on the input fields, selection lists and the existing checkboxes are not accessible to screen reader users.

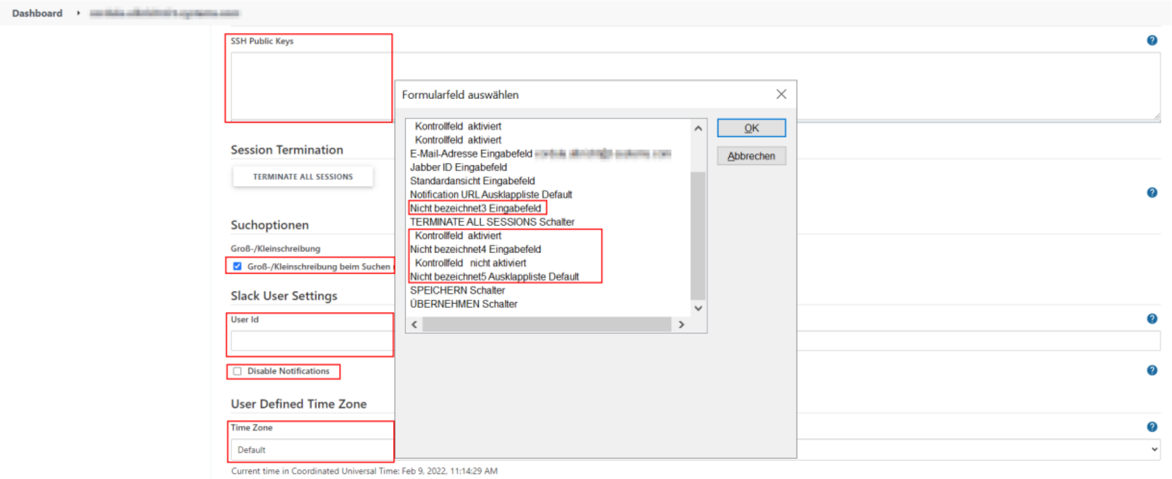
! This is because these labels are either not defined as <label> at all, or the <label> element is not associated with the corresponding form elements.

! In some cases, the screen reader still outputs some captions, although the links to the form elements are not given.



Suchen Eingabefeld
Nicht bezeichnet1 Eingabefeld [redacted]
Nicht bezeichnet2 Eingabefeld
ADD NEW TOKEN Schalter
Kontrollfeld aktiviert
Kontrollfeld aktiviert
E-Mail-Adresse Eingabefeld [redacted]
Jabber ID Eingabefeld
Standardansicht Eingabefeld
Notification URL Ausklappliste Default
Nicht bezeichnet3 Eingabefeld
TERMINATE ALL SESSIONS Schalter
Kontrollfeld aktiviert
Nicht bezeichnet4 Eingabefeld

Figure 2.38: Labels are not recognized by the screen reader (example: personal settings part 1)



Kontrollfeld aktiviert
Kontrollfeld aktiviert
E-Mail-Adresse Eingabefeld [redacted]
Jabber ID Eingabefeld
Standardansicht Eingabefeld
Notification URL Ausklappliste Default
Nicht bezeichnet3 Eingabefeld
TERMINATE ALL SESSIONS Schalter
Kontrollfeld aktiviert
Nicht bezeichnet4 Eingabefeld
Kontrollfeld nicht aktiviert
Nicht bezeichnet5 Ausklappliste Default
SPEICHERN Schalter
ÜBERNEHMEN Schalter

Current time in Coordinated Universal Time: Feb 9, 2022, 11:14:29 AM

Figure 2.39: Labels are not recognized by the screen reader (example: personal settings part 2)

Users with restricted motor skills are limited in the size of the click area for the form field due to the missing link between the label and the form field.

!Linking labels to their associated form fields through the label element ensures that the layout of a page is fixed and accessible regardless of the presentation. A unique relationship between the form field and the label is established via the <label> element, which is linked to the label via the for attribute. this makes possible

- Screen readers to read the associated captions for a field as the user navigates through the form elements

- Allow mouse users to set focus in the associated form element when they click the label and
- the highlighting of the currently active label.

→ All form fields, such as input fields, checkboxes and selection lists, must be appropriately labeled with a <label> element and this must be linked to the form field using the for attribute. In this way, a clear assignment can be made by the screen reader and the click area is expanded for users with limited mobility.

While most form fields have a visible label, the search fields in the header and in the Build History table on the branch page lack a visible label, instead using a "placeholder" in the input field as a replacement label. However, using placeholder attributes for input fields is problematic for all users because they disappear as you type.

! There is no need for a visible label, as the magnifying glass icon also shows the context of the input field. However, an accessible name is required for screen reader users.

→ The search input fields are to be labeled meaningfully with an aria label.

context	Header > Search input field Branch > Search input field within table in build history User menu > Settings
criteria	1.3.1 Information and Relationships
user groups	blind | motor impaired
category	hurdle

Result 13. Input fields for user data do not convey the purpose.

No language-independent input support is offered within the user profile settings that conveys the purpose of the input fields for the user name and email address, for example through an autocomplete attribute.

! Input fields that refer to the user himself should enable a semantically clear, language-independent determination of their purpose. The HTML autocomplete attribute is currently suitable for this, with which the input purpose for fields such as name, e-mail or telephone number as well as for address data or credit card data can be defined. It is expected that other taxonomies will be developed to define the purpose of interface components, which can replace the use of autocomplete.

→ To support language-independent operation, an autocomplete attribute should be offered in the user profile settings for the user name and e-mail address. In addition, the corresponding input types must be set correctly.

context	User Profile > Settings
criteria	1.3.5 Purpose of Entry
user groups	blind people
category	impairment

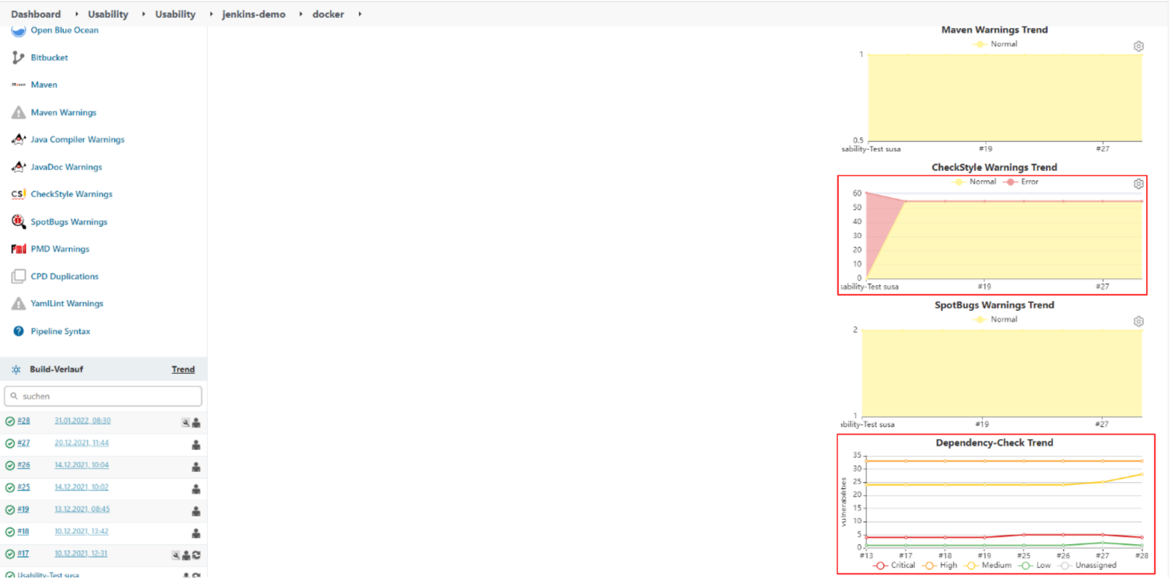
2.4 Alternatives for Non-Text Content

Result 14. Graphic evaluations are not accessible.

On the branch overview page, a lot of information is presented in diagrams. These diagrams apparently convey important information that is only prepared in graphic form and for which - at least in this view - no alternatives are provided.

! Note: The display of the diagrams may depend on certain settings, as these are only displayed for the selected "Usability" project and not for the "DevOps Showcase" project.

! To what extent the tables available under the menu options, some of which are identical, offer adequate values   cannot be assessed. This requires a professional assessment.



#28	31.01.2022, 08:30
#27	20.12.2021, 11:44
#26	14.12.2021, 10:04
#25	14.12.2021, 10:02
#19	13.12.2021, 08:45
#18	10.12.2021, 13:42
#17	10.12.2021, 12:31
Usability-Test susa	

Figure 2.40: Graphic content without text alternatives (“Usability” project)

! If the images or graphics or objects convey information, they require text alternatives that describe the content or purpose of the image and can be output by a screen reader. The text alternatives replace the image, so they should (if possible) do the same job as the image.

→ For all informative graphics (here: diagrams), corresponding alternatives should be made available in the form of tables.

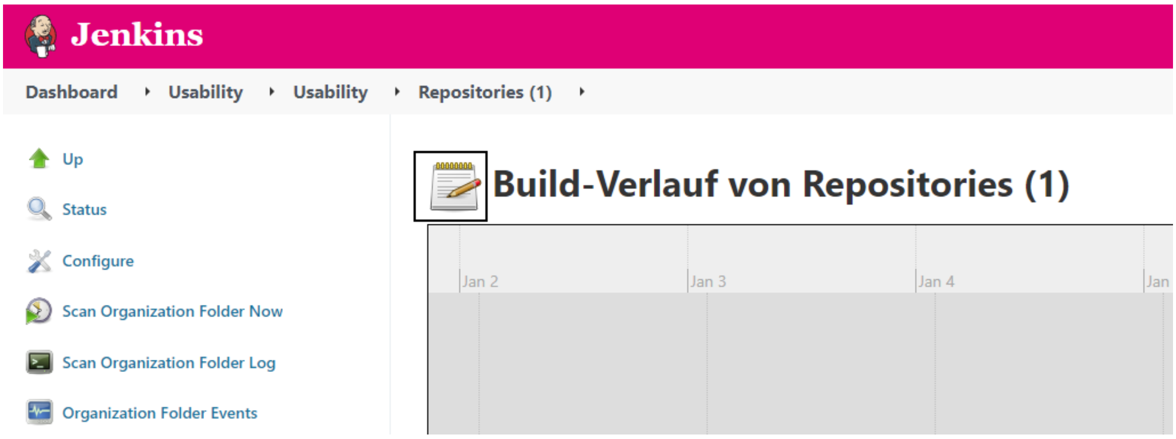
context	Dashboard > Usability folder > Usability project > jenkins-demo repository > docker branch
criteria	1.1.1 Non-Text Content
user groups	blind people
category	Best practice (since the addons are not included in the analysis)

Result 15. Decorative graphics are not hidden for blind users.

Decorative graphics are not recognized as such in various places, and the file name is output instead of a meaningful designation.

Below are some examples:

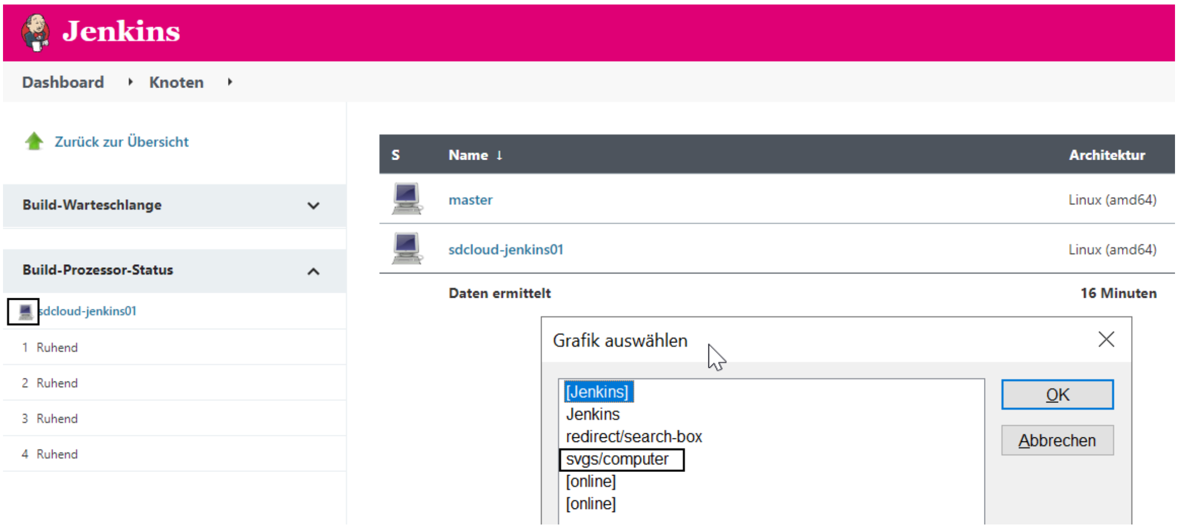
- Decorative graphics before the <h1> heading



Build-Verlauf von Repositories (1)

Figure 2.41: Decorative graphic before the <h1> heading not marked as such (example: repository build history)

- Decorative graphics before text links

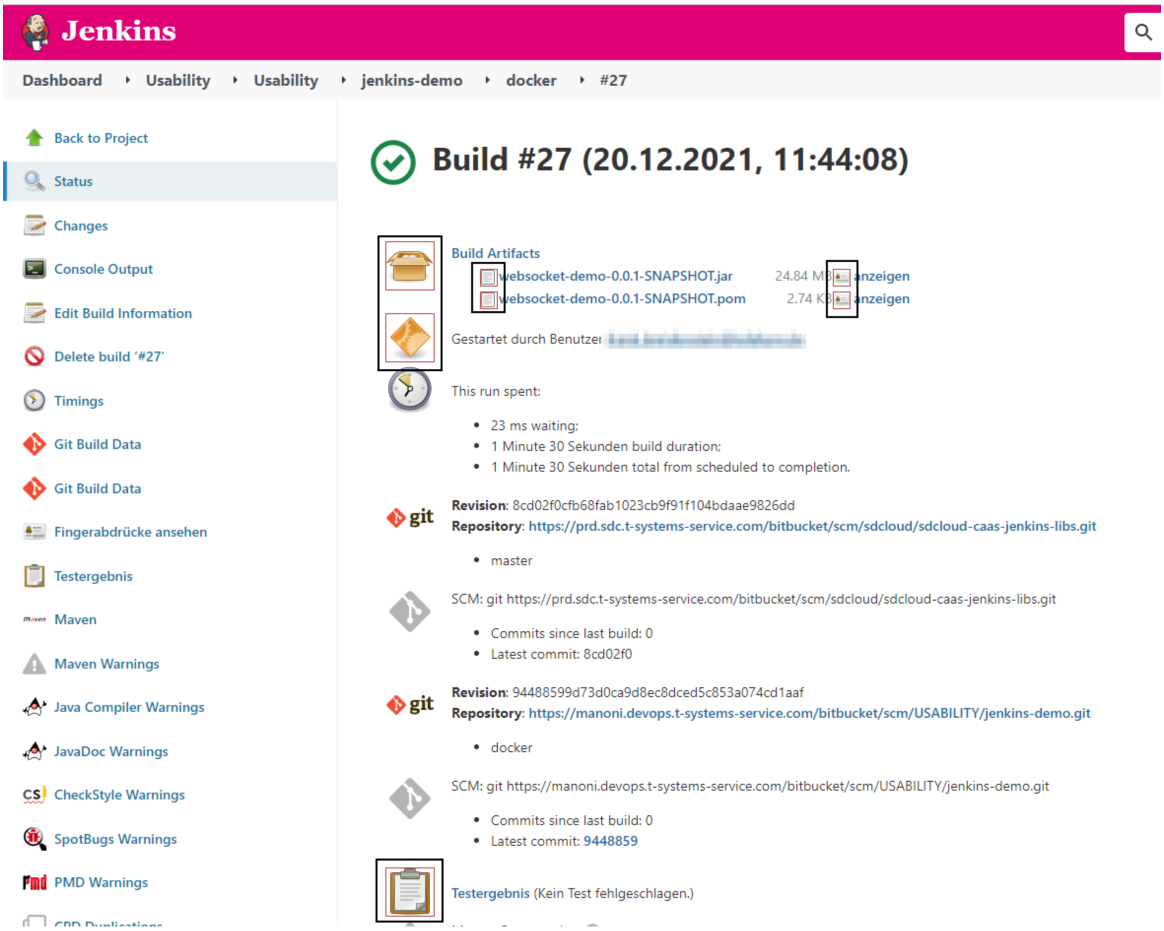


S	Name ↓	Architektur
	master	Linux (amd64)
	sdcloud-jenkins01	Linux (amd64)
	Daten ermittelt	16 Minuten

[Jenkins]
Jenkins
redirect/search-box
svgs/computer
[online]
[online]

Figure 2.42: Decorative graphic in front of agent link (sdcloud-jenkins01) not marked as such (example: node view)

- Various decorative graphics in the build view



Jenkins

Dashboard ‣ Usability ‣ Usability ‣ jenkins-demo ‣ docker ‣ #27

- Back to Project
- Status
- Changes
- Console Output
- Edit Build Information
- Delete build '#27'
- Timings
- Git Build Data
- Git Build Data
- Fingerabdrücke ansehen
- Testergebnis
- Maven
- Maven Warnings
- Java Compiler Warnings
- JavaDoc Warnings
- CheckStyle Warnings
- SpotBugs Warnings
- PMD Warnings
- CPD Duplications

Build #27 (20.12.2021, 11:44:08)

Build Artifacts

websocket-demo-0.0.1-SNAPSHOT.jar	24.84 MB	anzeigen
websocket-demo-0.0.1-SNAPSHOT.pom	2.74 KB	anzeigen

Gestartet durch Benutzer [redacted]

This run spent:

- 23 ms waiting;
- 1 Minute 30 Sekunden build duration;
- 1 Minute 30 Sekunden total from scheduled to completion.

Revision: 8cd02f0cfb68fab1023cb9f91f104bdaae9826dd
Repository: https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-caas-jenkins-libs.git

- master

SCM: git https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-caas-jenkins-libs.git

- Commits since last build: 0
- Latest commit: 8cd02f0

Revision: 94488599d73d0ca9d8ec8dced5c853a074cd1aaf
Repository: https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git

- docker

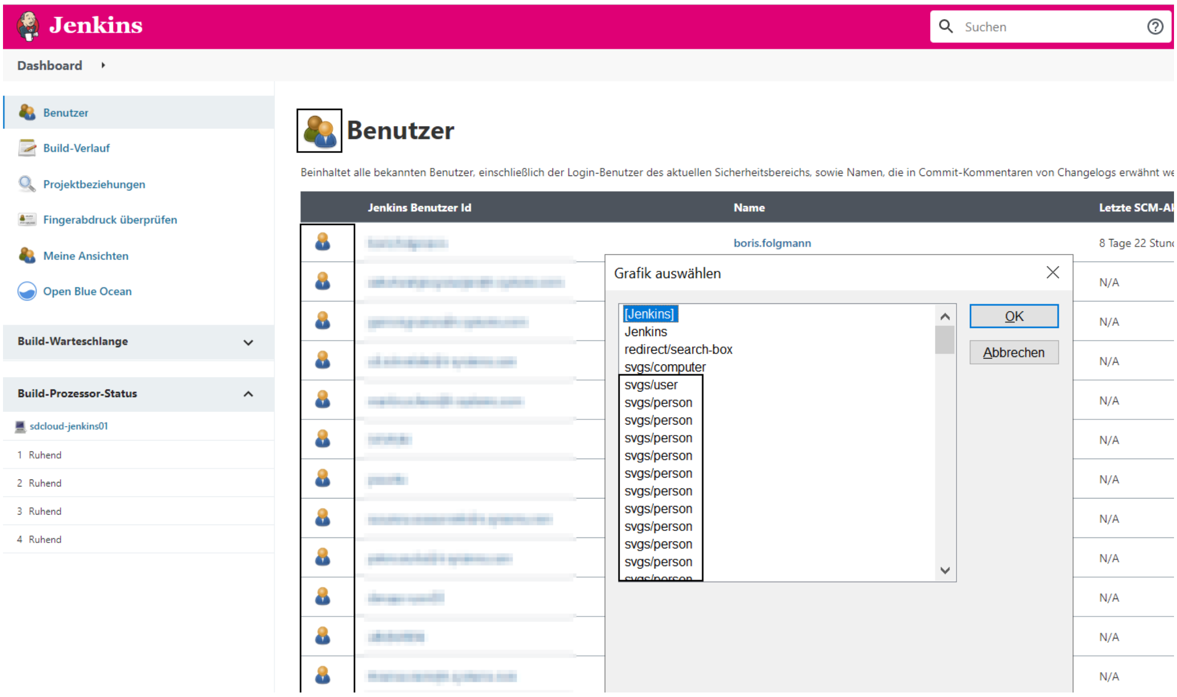
SCM: git https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenkins-demo.git

- Commits since last build: 0
- Latest commit: 9448859

Testergebnis (Kein Test fehlgeschlagen.)

Figure 2.43: Various decorative graphics not marked as such (example: build view)

- The linked user icons in the first column of the user table are all output with the same file name "Person" and cannot be distinguished.



Benutzer

Beinhaltet alle bekannten Benutzer, einschließlich der Login-Benutzer des aktuellen Sicherheitsbereichs, sowie Namen, die in Commit-Kommentaren von Changelogs erwähnt we

	Jenkins Benutzer Id	Name	Letzte SCM-A
	[redacted]	boris.folgmann	8 Tage 22 Stun
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A
	[redacted]		N/A

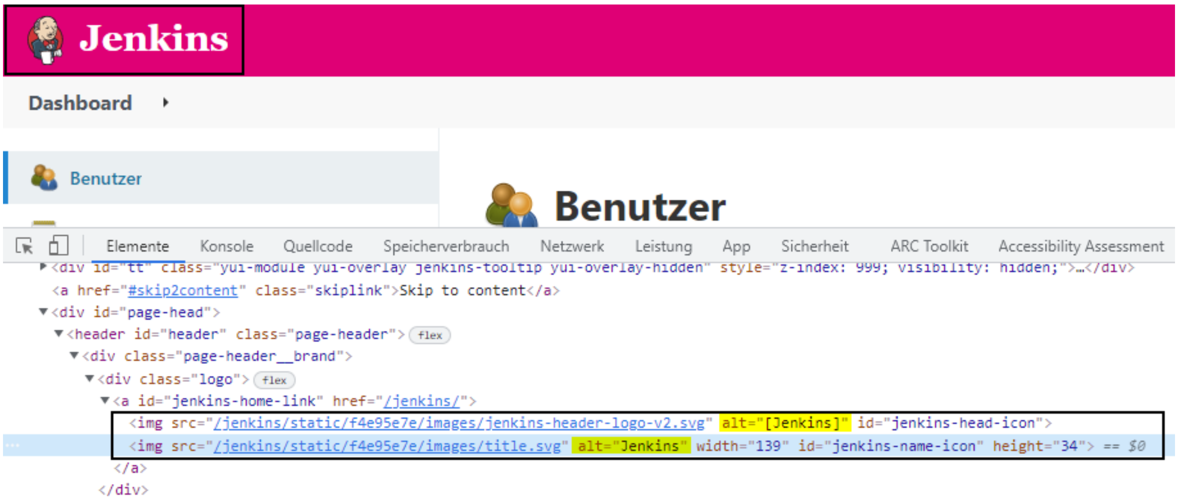
[Jenkins]
Jenkins
redirect/search-box
svgs/computer
svgs/user
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person
svgs/person

Figure 2.44: Decorative graphics in the first column of the table are not marked as such (example: user overview)

! A graphic that does not have an informative function does not need alt text. Graphics without an informative function are, for example, spacers, color areas, patterns or purely decorative photos.

→ Such graphics should be marked with an empty alt attribute (alt="") or only with the attribute name alt. This needs to be checked and corrected for all graphics throughout the application.

- In the header, both the Jenkins logo and the font graphic are given the same alternative text "Jenkins", which is displayed twice for screen reader users.



```
▶<div id="tt" class="yui-module yui-overlay jenkins-tooltip yui-overlay-hidden" style="z-index: 999; visibility: hidden;">…</div>
 <a href="#skip2content" class="skiplink">Skip to content</a>
▼<div id="page-head">
  ▼<header id="header" class="page-header"> flex
    ▼<div class="page-header__brand">
      ▼<div class="logo"> flex
        ▼<a id="jenkins-home-link" href="/jenkins/">
           <img src="/jenkins/static/f4e95e7e/images/jenkins-header-logo-v2.svg" alt="[Jenkins]" id="jenkins-head-icon">
           <img src="/jenkins/static/f4e95e7e/images/title.svg" alt="Jenkins" width="139" id="jenkins-name-icon" height="34"> == $0
         </a>
       </div>
```

Figure 2.45: Double text alternative with decorative graphic not marked as such (example: Jenkins logo in header)

! Note: The link target, on the other hand, is not sufficiently recognizable, since the link to the home page is not communicated. (see result 11)

→ Duplicate text alternatives should be avoided, which is why the existing two alt attributes, one should be empty to avoid duplicate output for screen reader users.

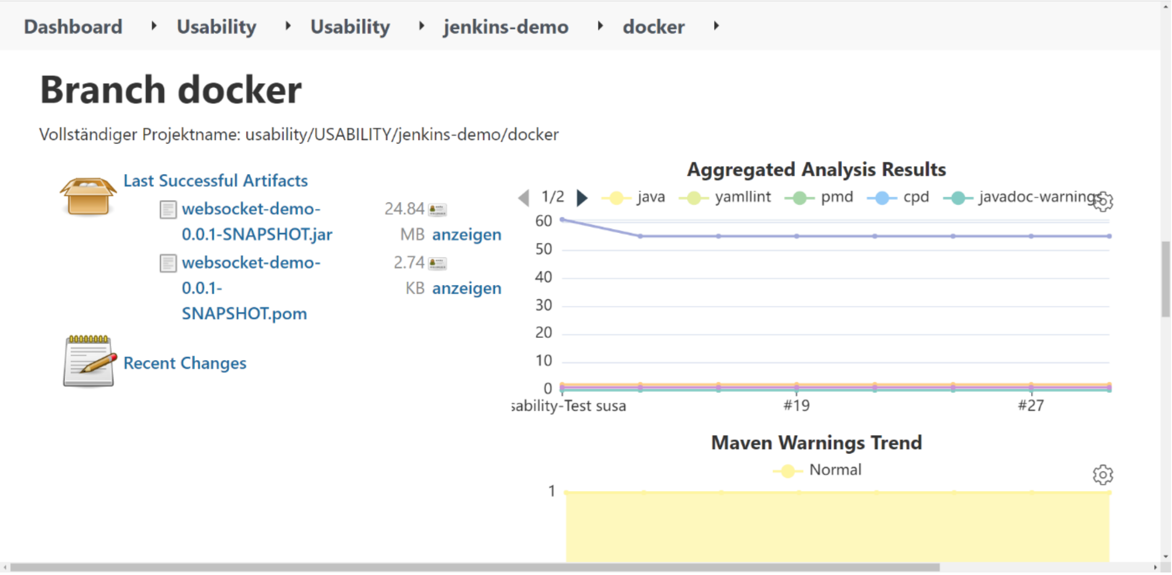
context	General (see examples)
criteria	1.1.1 Non-Text Content
user groups	blind people
category	impairment

2.5 Zoom and Font Enlargement

Result 16. The content does not wrap properly at 400%.

✓ With a set browser window width of 1280 CSS pixels and 200% zoom magnification, all content can be read without any problems. There is no overlapping or cutting off of important content.

Only in the diagrams are there minor cut-offs in the area of   the axis labels.



Dashboard ▸ Usability ▸ Usability ▸ jenkins-demo ▸ docker ▸

Branch docker

Vollständiger Projektname: usability/USABILITY/jenkins-demo/docker

Last Successful Artifacts

websocket-demo-0.0.1-SNAPSHOT.jar	24.84 MB	anzeigen
websocket-demo-0.0.1-SNAPSHOT.pom	2.74 KB	anzeigen

Recent Changes

Figure 2.46: Positive: important content is not overlaid at 200% magnification

However, the menu is not folded into a hamburger menu as usual when enlarged accordingly, so that the content is visible directly from the beginning of the page, but the menu takes up to three screen pages in its maximum state before the actual content becomes visible, like the following Demonstrate illustrations.

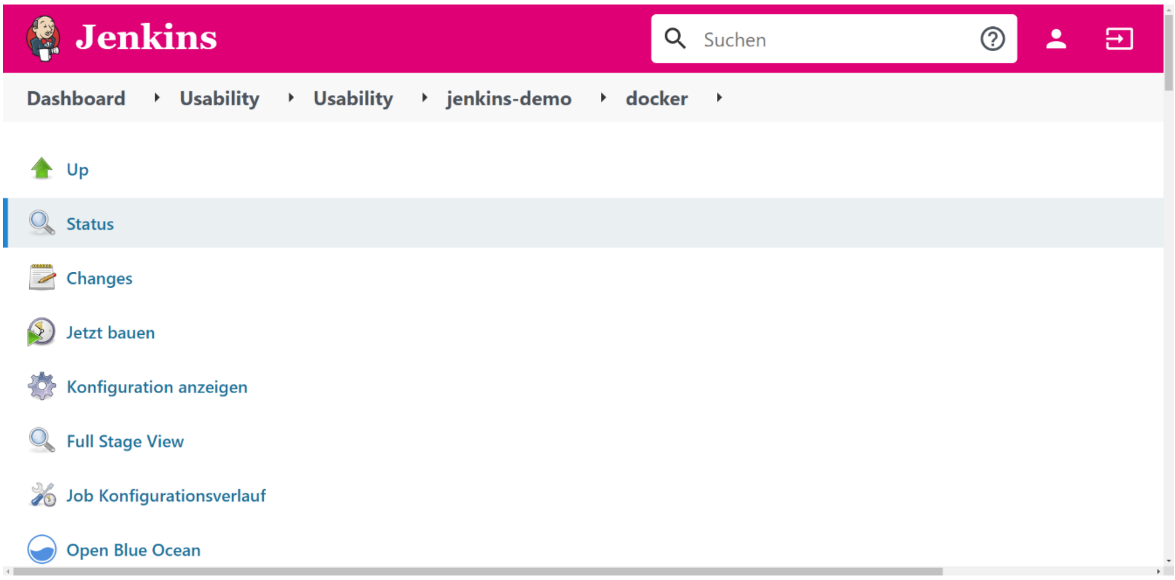


Figure 2.47: Menu at 200% magnification - Part 1

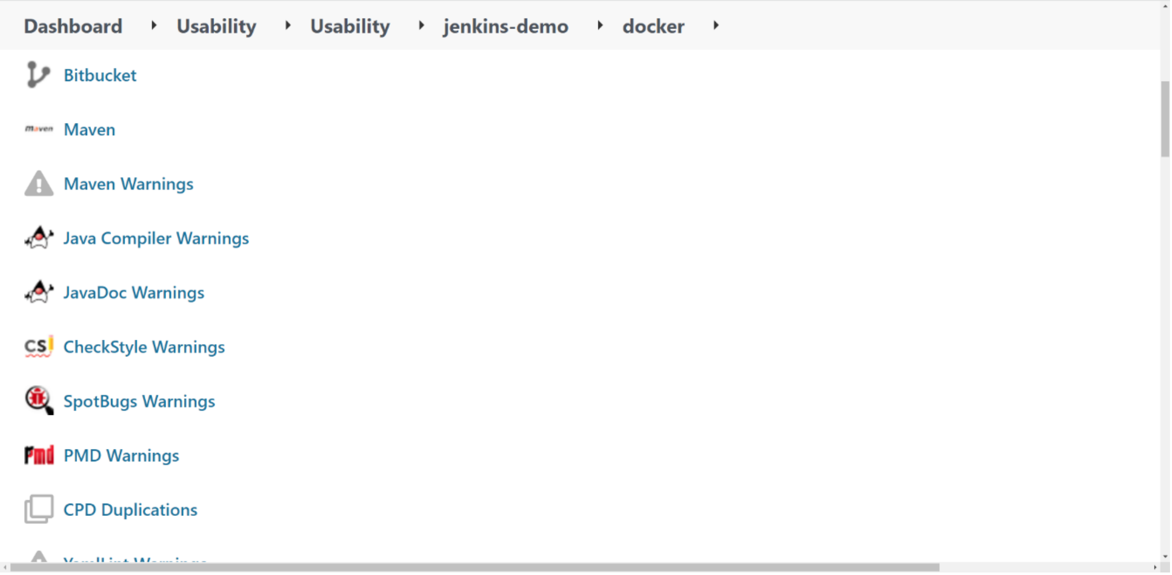
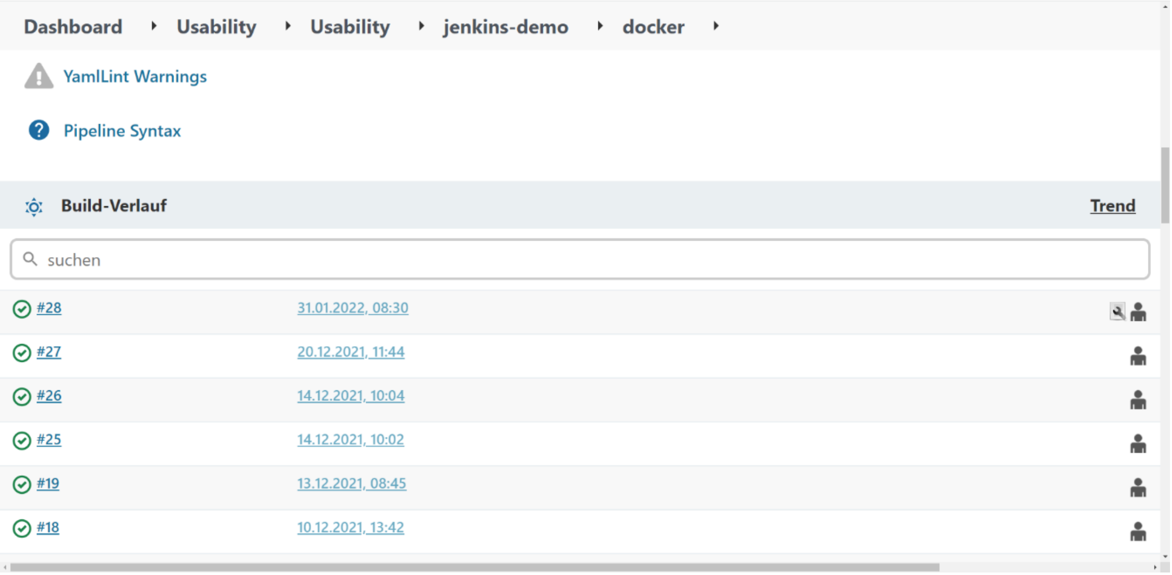


Figure 2.48: Menu at 200% magnification - part 2



Dashboard ▸ Usability ▸ Usability ▸ jenkins-demo ▸ docker ▸

YamlLint Warnings

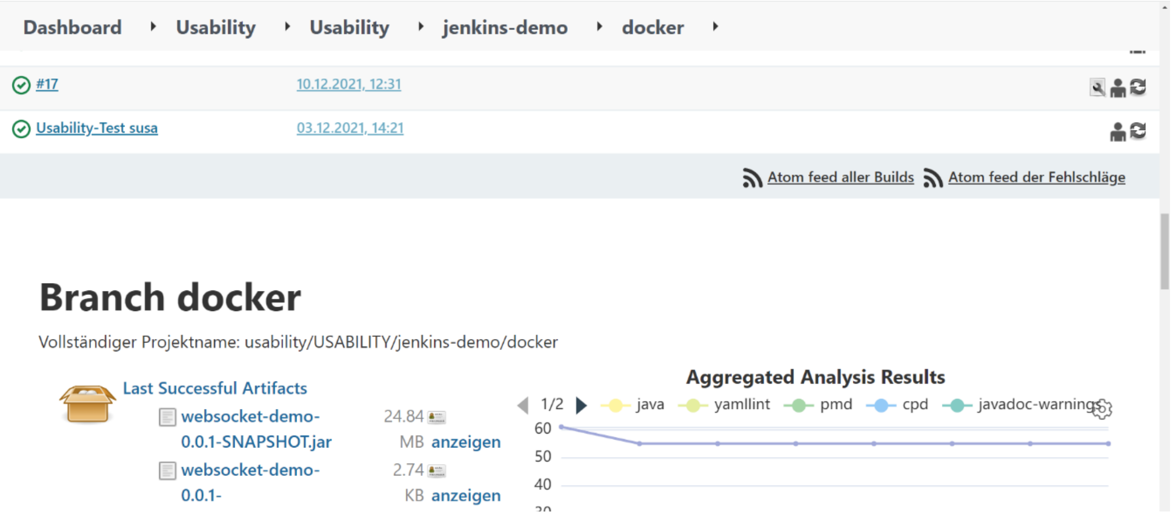
Pipeline Syntax

Build-Verlauf — Trend

suchen

#28	31.01.2022, 08:30
#27	20.12.2021, 11:44
#26	14.12.2021, 10:04
#25	14.12.2021, 10:02
#19	13.12.2021, 08:45
#18	10.12.2021, 13:42

Figure 2.49: Menu and build history at 200% magnification Part 3



Dashboard ▸ Usability ▸ Usability ▸ jenkins-demo ▸ docker ▸

#17	10.12.2021, 12:31
Usability-Test susa	03.12.2021, 14:21

Atom feed aller Builds Atom feed der Fehlschläge

Branch docker

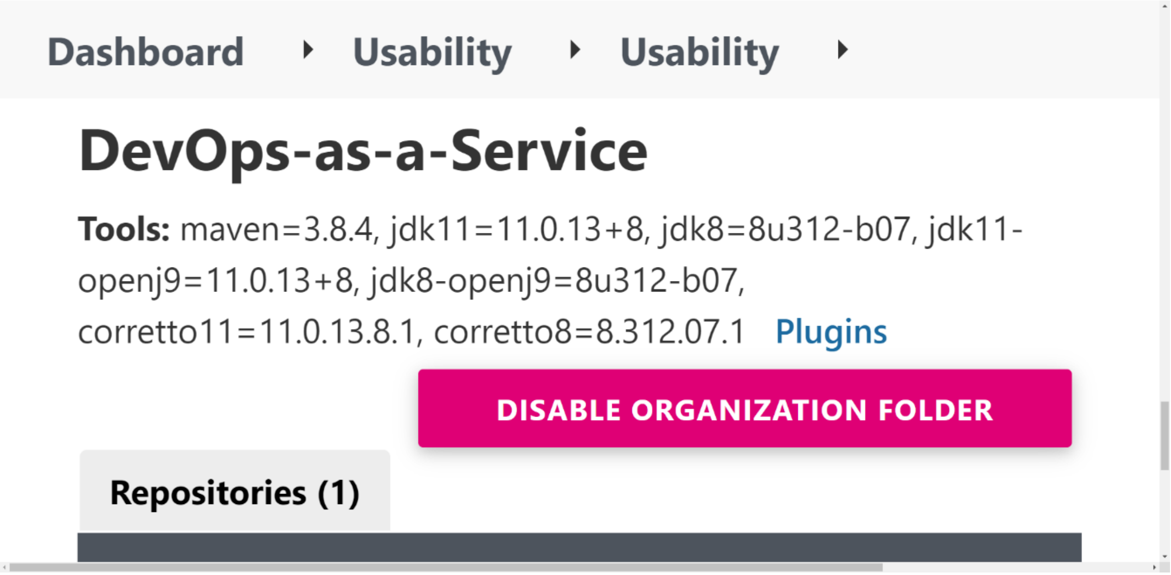
Vollständiger Projektname: usability/USABILITY/jenkins-demo/docker

Last Successful Artifacts

websocket-demo-0.0.1-SNAPSHOT.jar	24.84 MB	anzeigen
websocket-demo-0.0.1-	2.74 KB	anzeigen

Figure 2.50: After three screens, finally content at 200% magnification

✓ At 400% magnification, text and buttons wrap correctly.



Dashboard ▸ Usability ▸ Usability ▸

DevOps-as-a-Service

Tools: maven=3.8.4, jdk11=11.0.13+8, jdk8=8u312-b07, jdk11-openj9=11.0.13+8, jdk8-openj9=8u312-b07, corretto11=11.0.13.8.1, corretto8=8.312.07.1 Plugins

Figure 2.51: Positive: correct break at 400% magnification

However, there is a significant loss of content within the diagrams due to cutting off in the area of the legend labels. Tooltips on the vertical axis, which show details of the diagram values when you mouse over them, are positioned far enough (fixed) to the left that they are no longer visible at this magnification.

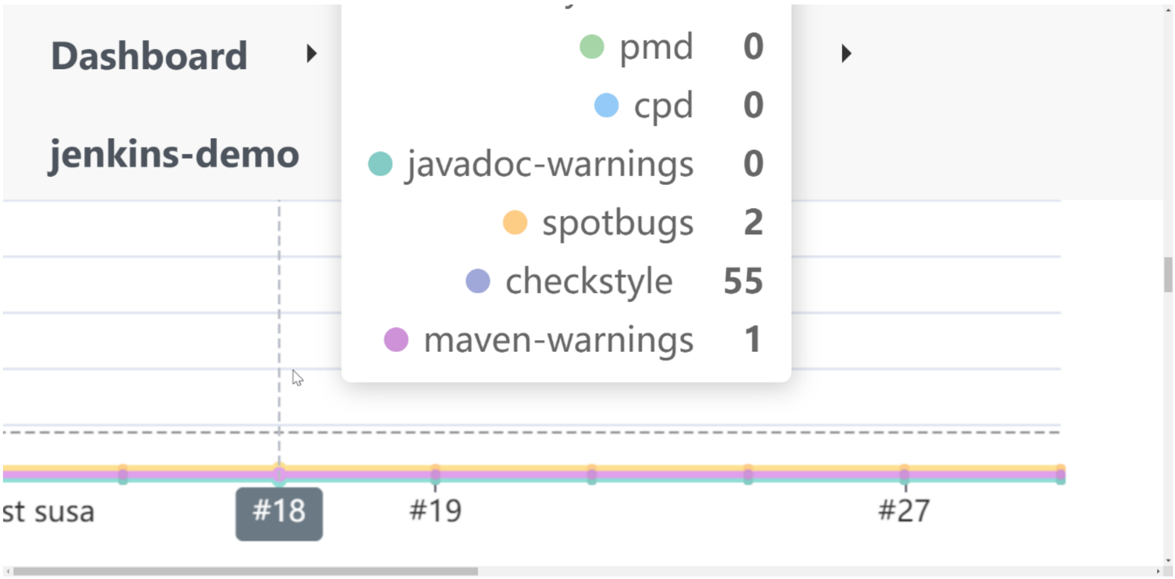


Figure 2.52: At 400% magnification, the vertical legend is missing

! Note: Even without enlargement, there are shifts in the responsive layout on the branch page, which means that the overview table for the "Stage View", which is important from the user's point of view, only becomes visible after a long scrolling time. See usability report addendum 15 for details.

→ The layout should be revised so that the "Stage View" overview is immediately visible in the main content area of the branch page. Alternatively, other mechanisms should be provided so that users can hide the displayed diagrams on this page.

→ The diagrams should be integrated in such a way that they are displayed completely, including all axes and tooltips, in the visible area.

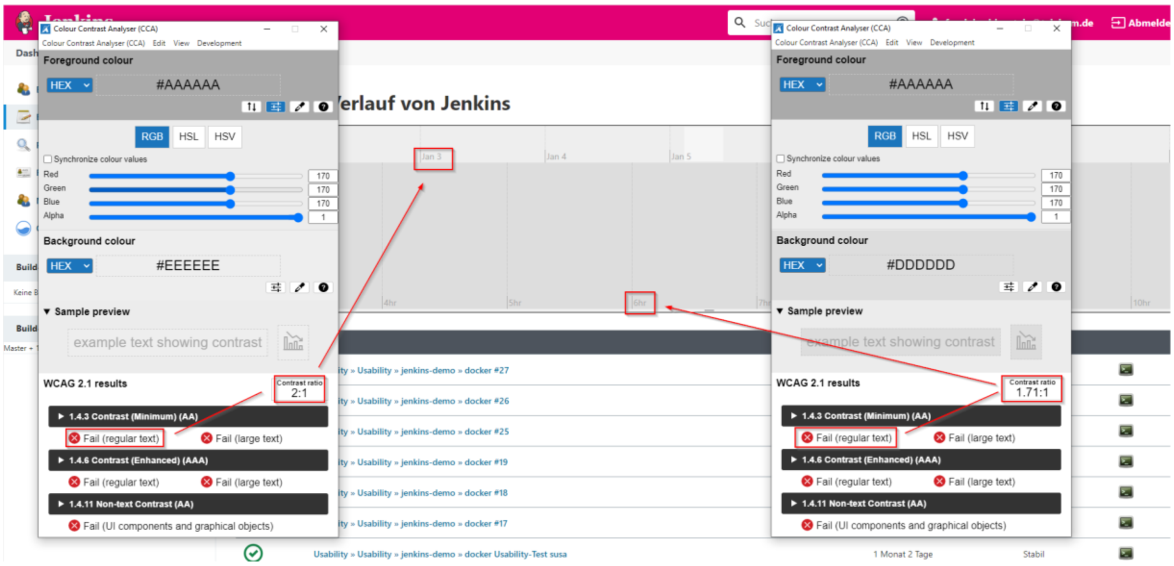
context	Dashboard > Folder > Project > Repository > Branch page
criteria	1.4.4 Changeable text size 1.4.10 Reformatting
user groups	visually impaired
category	impairment

2.6 Colors and Contrasts

Result 17. Some content is not easily recognizable due to poor contrast.

Contrasts are sometimes insufficient, so that information is difficult to read or recognizable. The following examples stood out:

- In the build history, the dates and times in the timeline are hard to read. The contrast is only 1.71 or 2.1 instead of the necessary contrast of 4.5:1.



Colour Contrast Analyser (CCA)

Foreground colour: HEX #AAAAAA

RGB: Red 170, Green 170, Blue 170, Alpha 1

Background colour: HEX #EEEEEE

Sample preview: example text showing contrast

WCAG 2.1 results — Contrast ratio 2:1

1.4.3 Contrast (Minimum) (AA): Fail (regular text), Fail (large text)

1.4.6 Contrast (Enhanced) (AAA): Fail (regular text), Fail (large text)

1.4.11 Non-text Contrast (AA): Fail (UI components and graphical objects)

Colour Contrast Analyser (CCA)

Foreground colour: HEX #AAAAAA

RGB: Red 170, Green 170, Blue 170, Alpha 1

Background colour: HEX #DDDDDD

Sample preview: example text showing contrast

WCAG 2.1 results — Contrast ratio 1.71:1

1.4.3 Contrast (Minimum) (AA): Fail (regular text), Fail (large text)

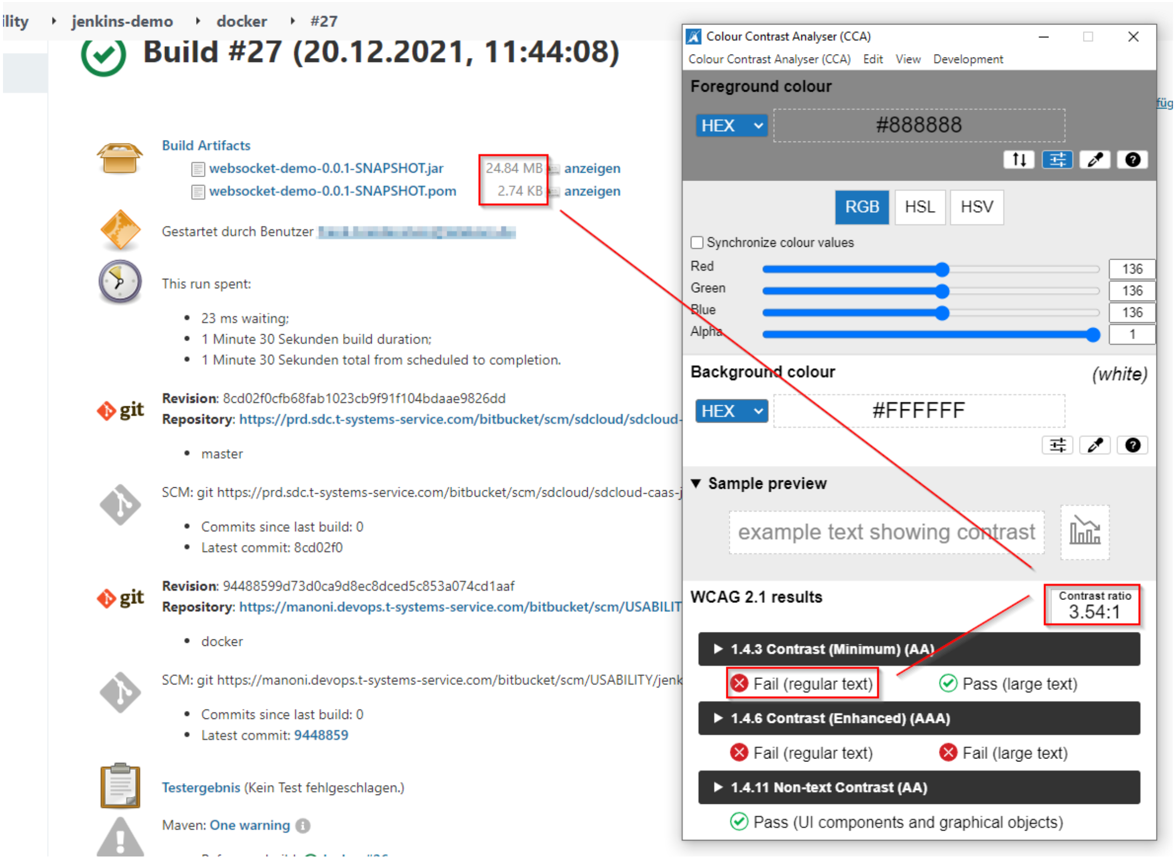
1.4.6 Contrast (Enhanced) (AAA): Fail (regular text), Fail (large text)

1.4.11 Non-text Contrast (AA): Fail (UI components and graphical objects)

Verlauf von Jenkins
Jan 3
Jan 4
Jan 5
4hr
5hr
6hr
7hr
10hr
Usability » Usability » jenkins-demo » docker #27
Usability » Usability » jenkins-demo » docker #26
Usability » Usability » jenkins-demo » docker #25
Usability » Usability » jenkins-demo » docker #19
Usability » Usability » jenkins-demo » docker #18
Usability » Usability » jenkins-demo » docker #17
Usability » Usability » jenkins-demo » docker Usability-Test susa
1 Monat 2 Tage
Stabil
Abmelden

Figure 2.53: Difficult to see information in the build history timeline

- In the build status, the sizes of the build artifacts are difficult to read. The contrast is 3.54:1 instead of 4.5:1.



ility › jenkins-demo › docker › #27

Build #27 (20.12.2021, 11:44:08)

Build Artifacts
- websocket-demo-0.0.1-SNAPSHOT.jar 24.84 MB anzeigen
- websocket-demo-0.0.1-SNAPSHOT.pom 2.74 KB anzeigen

Gestartet durch Benutzer [redacted]

This run spent:

- 23 ms waiting;
- 1 Minute 30 Sekunden build duration;
- 1 Minute 30 Sekunden total from scheduled to completion.

Revision: 8cd02f0cfb68fab1023cb9f91f104bdaae9826dd
Repository: https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-

- master

SCM: git https://prd.sdc.t-systems-service.com/bitbucket/scm/sdcloud/sdcloud-caas-j

- Commits since last build: 0
- Latest commit: 8cd02f0

Revision: 94488599d73d0ca9d8ec8dced5c853a074cd1aaf
Repository: https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILIT

- docker

SCM: git https://manoni.devops.t-systems-service.com/bitbucket/scm/USABILITY/jenk

- Commits since last build: 0
- Latest commit: 9448859

Testergebnis (Kein Test fehlgeschlagen.)

Maven: One warning

Colour Contrast Analyser (CCA)

Foreground colour

HEX #888888

RGB HSL HSV

☐ Synchronize colour values

Red 136
Green 136
Blue 136
Alpha 1

Background colour *(white)*

HEX #FFFFFF

▼ **Sample preview**

example text showing contrast

WCAG 2.1 results

Contrast ratio 3.54:1

▶ **1.4.3 Contrast (Minimum) (AA)**

☒ Fail (regular text) ✓ Pass (large text)

▶ **1.4.6 Contrast (Enhanced) (AAA)**

☒ Fail (regular text) ☒ Fail (large text)

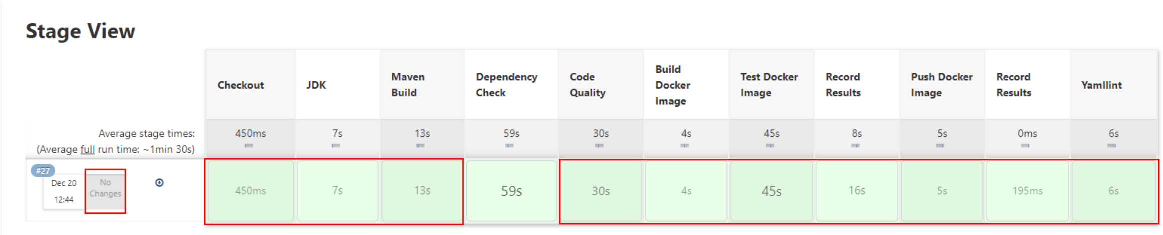
▶ **1.4.11 Non-text Contrast (AA)**

✓ Pass (UI components and graphical objects)

Figure 2.54: Badly recognizable sizes of the build artifacts in the build status

- Within the table in the Stage View there is a lot of text content that is very difficult to read due to the poor contrast. The contrasts range from 2.26:1 (text in the first column) through 2.5:1 (for a time of 450 ms) to 4.36:1 (for a time of 30 s). It seems as if the contrast values increase as the values increase.

! Even if the reasoning behind this is that very low values are not so relevant and therefore do not have to "catch the eye" so much, visually impaired users cannot recognize the values and therefore cannot judge whether it is their visual abilities or that is intended .



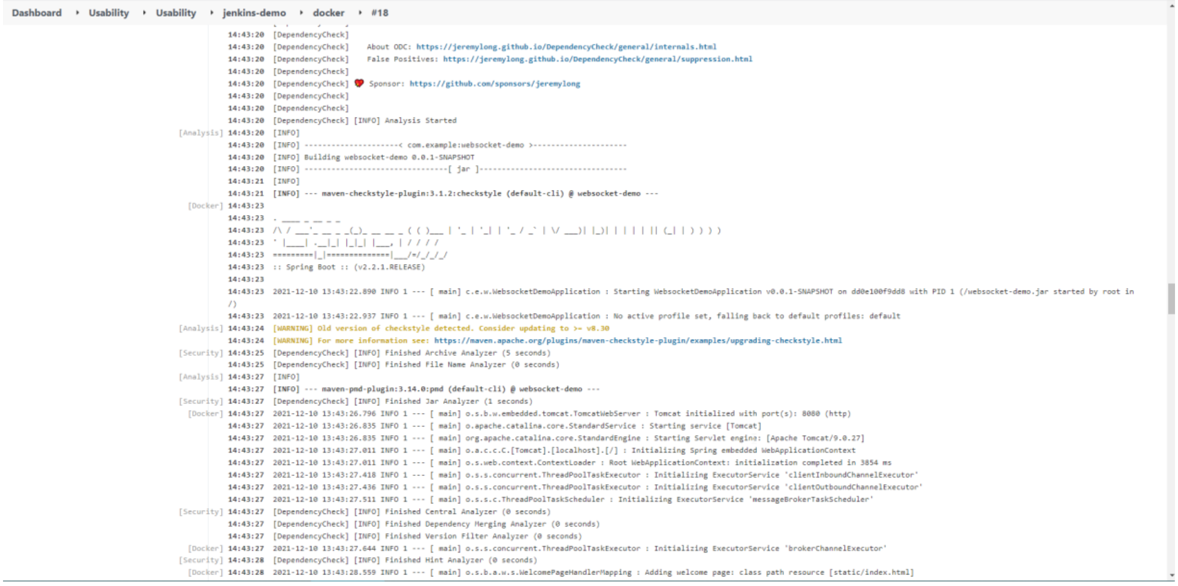
Stage View

	Checkout	JDK	Maven Build	Dependency Check	Code Quality	Build Docker Image	Test Docker Image	Record Results	Push Docker Image	Record Results	Yamllint
Average stage times: (Average full run time: ~1min 30s)	450ms	7s	13s	59s	30s	4s	45s	8s	5s	0ms	6s
#27 Dec 20 12:44 No Changes	450ms	7s	13s	59s	30s	4s	45s	16s	5s	195ms	6s

Figure 2.55: Difficult to see information in the Stage View table (Branch Docker)

- In the console outputs, important information is not only marked by keywords [ERROR], [WARNING]), but also highlighted in color.

! However, the yellow font color on a white background is difficult to read, the contrast is 2.5.1.

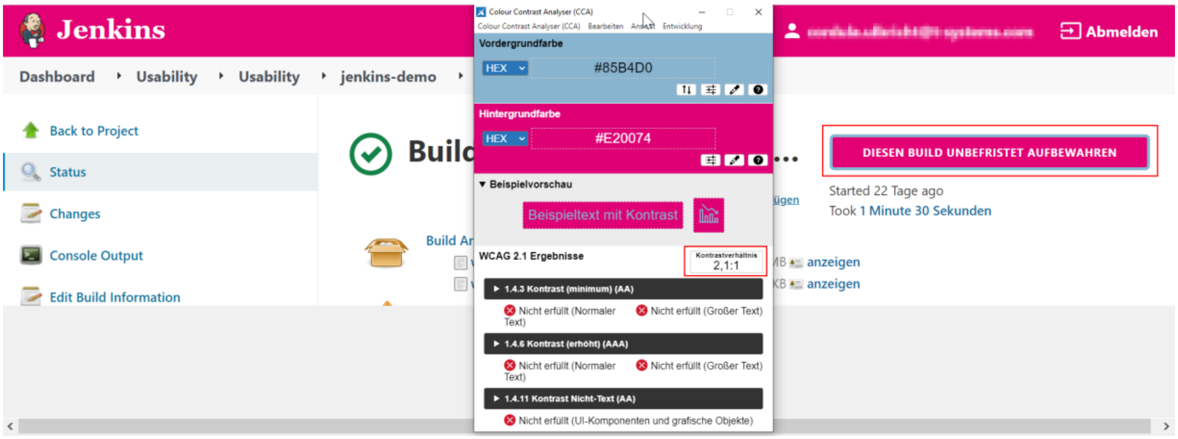


```
                 14:43:20  [DependencyCheck]
                 14:43:20  [DependencyCheck]    About ODC: https://jeremylong.github.io/DependencyCheck/general/internals.html
                 14:43:20  [DependencyCheck]    False Positives: https://jeremylong.github.io/DependencyCheck/general/suppression.html
                 14:43:20  [DependencyCheck]
                 14:43:20  [DependencyCheck] ❤ Sponsor: https://github.com/sponsors/jeremylong
                 14:43:20  [DependencyCheck]
                 14:43:20  [DependencyCheck]
                 14:43:20  [DependencyCheck] [INFO] Analysis Started
      [Analysis] 14:43:20  [INFO]
                 14:43:20  [INFO] --------------------< com.example:websocket-demo >--------------------
                 14:43:20  [INFO] Building websocket-demo 0.0.1-SNAPSHOT
                 14:43:20  [INFO] --------------------------------[ jar ]---------------------------------
                 14:43:21  [INFO]
                 14:43:21  [INFO] --- maven-checkstyle-plugin:3.1.2:checkstyle (default-cli) @ websocket-demo ---
        [Docker] 14:43:23
                 14:43:23  . ____ _ __ _ _
                 14:43:23  /\ / ___'_ __ _ _(_)_ __ __ _ ( ( )___ | '_ | '_| | '_ / _` | \/ ___)| |_)| | | | | || (_| | ) ) ) )
                 14:43:23  ' |____| .__|_| |_|_| |___, | / / / /
                 14:43:23  =========|_|==============|___/=/_/_/_/
                 14:43:23  :: Spring Boot :: (v2.2.1.RELEASE)
                 14:43:23
                 14:43:23  2021-12-10 13:43:22.890 INFO 1 --- [ main] c.e.w.WebsocketDemoApplication : Starting WebsocketDemoApplication v0.0.1-SNAPSHOT on dd0e100f9dd8 with PID 1 (/websocket-demo.jar started by root in
                 /)
                 14:43:23  2021-12-10 13:43:22.937 INFO 1 --- [ main] c.e.w.WebsocketDemoApplication : No active profile set, falling back to default profiles: default
      [Analysis] 14:43:24  [WARNING] Old version of checkstyle detected. Consider updating to >= v8.30
                 14:43:24  [WARNING] For more information see: https://maven.apache.org/plugins/maven-checkstyle-plugin/examples/upgrading-checkstyle.html
      [Security] 14:43:25  [DependencyCheck] [INFO] Finished Archive Analyzer (5 seconds)
                 14:43:25  [DependencyCheck] [INFO] Finished File Name Analyzer (0 seconds)
      [Analysis] 14:43:27  [INFO]
                 14:43:27  [INFO] --- maven-pmd-plugin:3.14.0:pmd (default-cli) @ websocket-demo ---
      [Security] 14:43:27  [DependencyCheck] [INFO] Finished Jar Analyzer (1 seconds)
        [Docker] 14:43:27  2021-12-10 13:43:26.796 INFO 1 --- [ main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
                 14:43:27  2021-12-10 13:43:26.835 INFO 1 --- [ main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
                 14:43:27  2021-12-10 13:43:26.835 INFO 1 --- [ main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.27]
                 14:43:27  2021-12-10 13:43:27.011 INFO 1 --- [ main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
                 14:43:27  2021-12-10 13:43:27.011 INFO 1 --- [ main] o.s.web.context.ContextLoader : Root WebApplicationContext: initialization completed in 3854 ms
                 14:43:27  2021-12-10 13:43:27.418 INFO 1 --- [ main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'clientInboundChannelExecutor'
                 14:43:27  2021-12-10 13:43:27.436 INFO 1 --- [ main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'clientOutboundChannelExecutor'
                 14:43:27  2021-12-10 13:43:27.511 INFO 1 --- [ main] o.s.s.c.ThreadPoolTaskScheduler : Initializing ExecutorService 'messageBrokerTaskScheduler'
      [Security] 14:43:27  [DependencyCheck] [INFO] Finished Central Analyzer (0 seconds)
                 14:43:27  [DependencyCheck] [INFO] Finished Dependency Merging Analyzer (0 seconds)
                 14:43:27  [DependencyCheck] [INFO] Finished Version Filter Analyzer (0 seconds)
        [Docker] 14:43:27  2021-12-10 13:43:27.644 INFO 1 --- [ main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'brokerChannelExecutor'
      [Security] 14:43:28  [DependencyCheck] [INFO] Finished Hint Analyzer (0 seconds)
        [Docker] 14:43:28  2021-12-10 13:43:28.559 INFO 1 --- [ main] o.s.b.a.w.s.WelcomePageHandlerMapping : Adding welcome page: class path resource [static/index.html]
```

Figure 2.56: Warnings are highlighted in yellow font

- Individual focused UI elements in the build detail view are difficult to distinguish from the unfocused state.

! While simple text links are provided with an easily perceptible black frame, magenta-colored buttons are marked with a blue focus frame, CSS buttons are only highlighted with a gray background, both of which do not have the required contrast of 3:1, but 2.1: 1 or 1.1:1.



Vordergrundfarbe
HEX #85B4D0

Hintergrundfarbe
HEX #E20074

Beispielvorschau
Beispieltext mit Kontrast

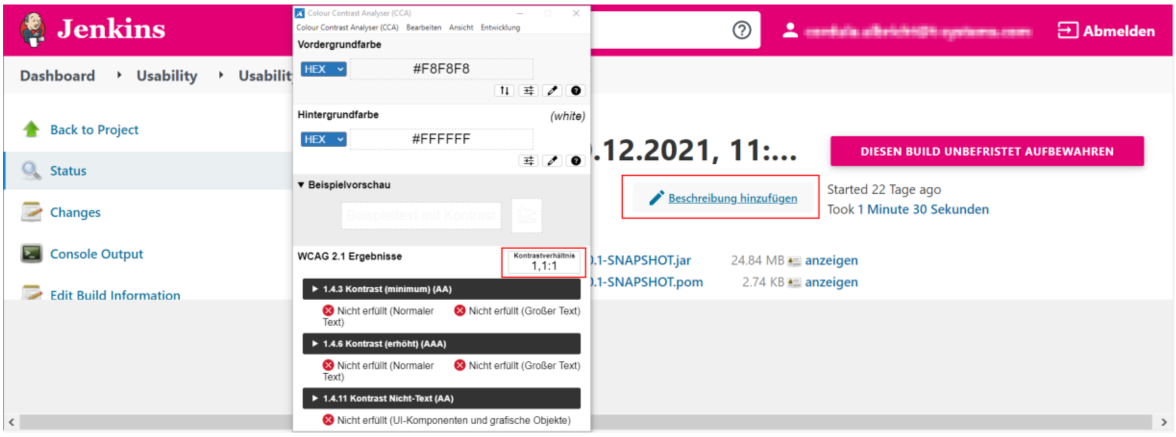
WCAG 2.1 Ergebnisse
Kontrastverhältnis 2,1:1

1.4.3 Kontrast (minimum) (AA)
☒ Nicht erfüllt (Normaler Text) ☒ Nicht erfüllt (Großer Text)

1.4.6 Kontrast (erhöht) (AAA)
☒ Nicht erfüllt (Normaler Text) ☒ Nicht erfüllt (Großer Text)

1.4.11 Kontrast Nicht-Text (AA)
☒ Nicht erfüllt (UI-Komponenten und grafische Objekte)

Figure 2.57: Difficult to see difference between focused and unfocused buttons (1/2)



Jenkins

Dashboard ‣ Usability ‣ Usabilit

[redacted] Abmelden

Back to Project

Status

Changes

Console Output

Edit Build Information

Colour Contrast Analyser (CCA)

Colour Contrast Analyser (CCA) Bearbeiten Ansicht Entwicklung

Vordergrundfarbe

HEX #F8F8F8

Hintergrundfarbe (white)

HEX #FFFFFF

▼ Beispielvorschau

Beispieltext mit Kontrast

WCAG 2.1 Ergebnisse

Kontrastverhältnis 1,1:1

▸ 1.4.3 Kontrast (minimum) (AA)

Nicht erfüllt (Normaler Text) Nicht erfüllt (Großer Text)

▸ 1.4.6 Kontrast (erhöht) (AAA)

Nicht erfüllt (Normaler Text) Nicht erfüllt (Großer Text)

▸ 1.4.11 Kontrast Nicht-Text (AA)

Nicht erfüllt (UI-Komponenten und grafische Objekte)

.12.2021, 11:...

DIESEN BUILD UNBEFRISTET AUFBEWAHREN

Beschreibung hinzufügen

Started 22 Tage ago

Took 1 Minute 30 Sekunden

.1-SNAPSHOT.jar 24.84 MB anzeigen

.1-SNAPSHOT.pom 2.74 KB anzeigen

Figure 2.58: Difficult to see difference between focused and unfocused buttons (2/2)

! People with visual impairments rely on good contrasts of text and graphic content and controls to the adjacent colors of 4.5:1 (for text) or 3:1 (for non-text content) or better.

→ All text colors and associated background colors of the application should be checked. Insufficient contrast ratios with values less than 4.5:1 must be corrected.

→ The color of focus frames must be adjusted so that the difference to non-focused UI elements is at least 3:1.

→ If the focus is achieved by changing the colored background, this must be adjusted so that the difference to the background when not in focus is at least 3:1.

context	In general, see examples
criteria	1.4.3 Contrast 1.4.11 Non-Text Contrast 2.4.7 Visible Focus
user groups	visually impaired
category	hurdle

Outcome 18. Graphical information is conveyed only through color.

On the branch overview page, a lot of information is presented in diagrams. These charts convey their information via colored lines that cannot be distinguished by color-blind users.

✓ The meaning of the colors is explained in a corresponding legend.

! If information is conveyed exclusively via color, this is only available to users who are not restricted in their visual abilities. Blind and possibly also color-sighted users, who may work with their own color schemes, cannot identify and distinguish between colors or only to a limited extent. Content that is only conveyed via colors may not be perceived by blind users and may not be able to interact with it in the application.

! Note: The display of the diagrams may depend on certain settings, as these are only displayed for the selected "Usability" project and not for the "DevOps Showcase" project.

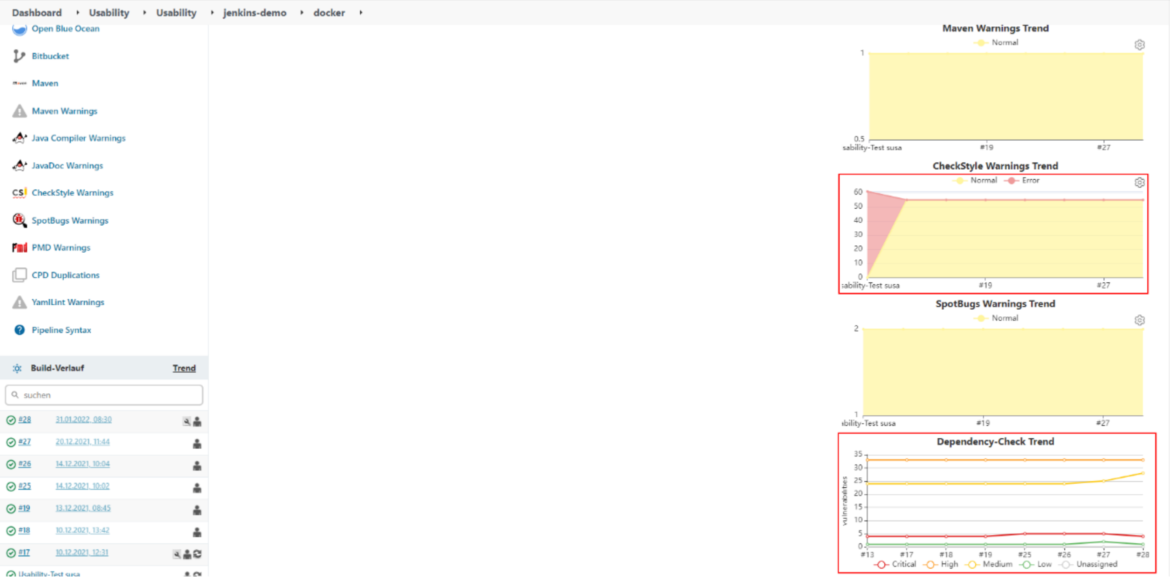


Figure 2.59: Graphic content is conveyed exclusively by color ("Usability" project)

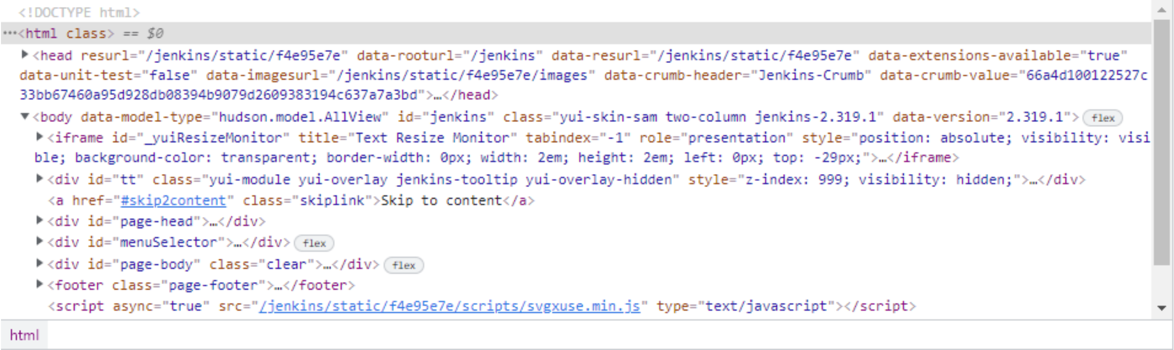
→ In addition to the colored lines in the diagrams, different line types should be used so that they can be distinguished.

context	Dashboard > Usability folder > Usability project > jenkins-demo repository > docker branch
criteria	1.4.1 Color
user groups	visually impaired
category	Best practice (since the addons are not included in the analysis)

2.7 Language

Result 19. The main language of the application is not specified correctly.

The Jenkins application does not have a main language specified in the <hmtl> element. The lang attribute is missing.



```
  <!DOCTYPE html>
•••<html class> == $0
  ▶<head resurl="/jenkins/static/f4e95e7e" data-rooturl="/jenkins" data-resurl="/jenkins/static/f4e95e7e" data-extensions-available="true"
  data-unit-test="false" data-imagesurl="/jenkins/static/f4e95e7e/images" data-crumb-header="Jenkins-Crumb" data-crumb-value="66a4d100122527c
  33bb67460a95d928db08394b9079d2609383194c637a7a3bd">…</head>
  ▼<body data-model-type="hudson.model.AllView" id="jenkins" class="yui-skin-sam two-column jenkins-2.319.1" data-version="2.319.1"> flex
    ▶<iframe id="_yuiResizeMonitor" title="Text Resize Monitor" tabindex="-1" role="presentation" style="position: absolute; visibility: visi
    ble; background-color: transparent; border-width: 0px; width: 2em; height: 2em; left: 0px; top: -29px;">…</iframe>
    ▶<div id="tt" class="yui-module yui-overlay jenkins-tooltip yui-overlay-hidden" style="z-index: 999; visibility: hidden;">…</div>
      <a href="#skip2content" class="skiplink">Skip to content</a>
    ▶<div id="page-head">…</div>
    ▶<div id="menuSelector">…</div> flex
    ▶<div id="page-body" class="clear">…</div> flex
    ▶<footer class="page-footer">…</footer>
      <script async="true" src="/jenkins/static/f4e95e7e/scripts/svgxuse.min.js" type="text/javascript"></script>
html
```

Figure 2.60 The <html> element does not have a lang attribute

! Assistive technologies as well as traditional user agents (browsers) can display text accurately if the language of the website is identified. Screen readers use word lists that specify the pronunciation of words. You need information about the language in which a text is written so that the correct word list can be used and the text can be pronounced correctly.

→ The main language, in this case German, must be specified on all pages using the <lang> attribute in the opening HTML element: <html lang="de">.

context	Generally
criteria	3.1.1 Language
user groups	blind people
category	impairment

Result 20. Many English terms are used in the German interface.

Despite the main application language "German", many terms are displayed in English, which means that blind users in particular have the ugly language mix read out by the screen reader. The following examples should only show this as an example.[6]

[6] The examples were taken from the current usability report.

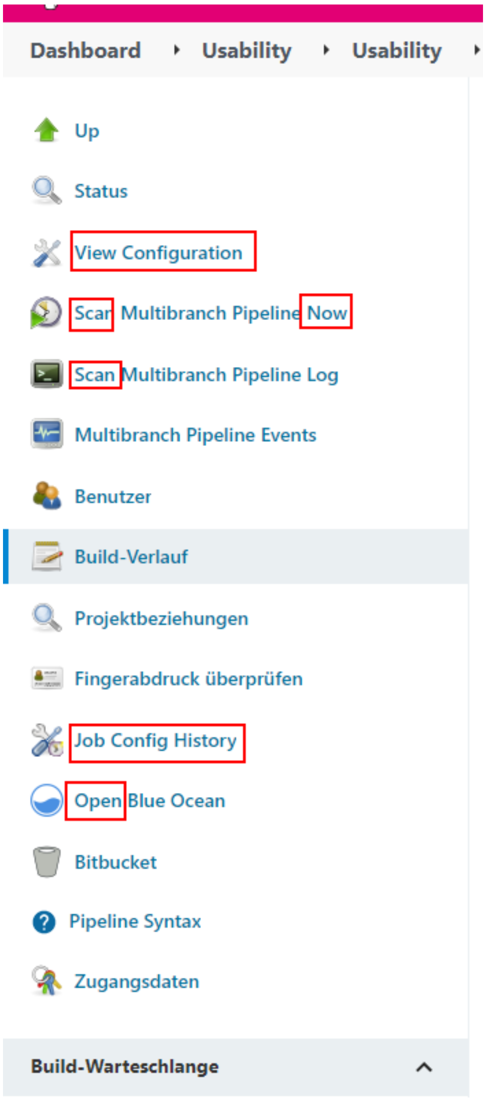
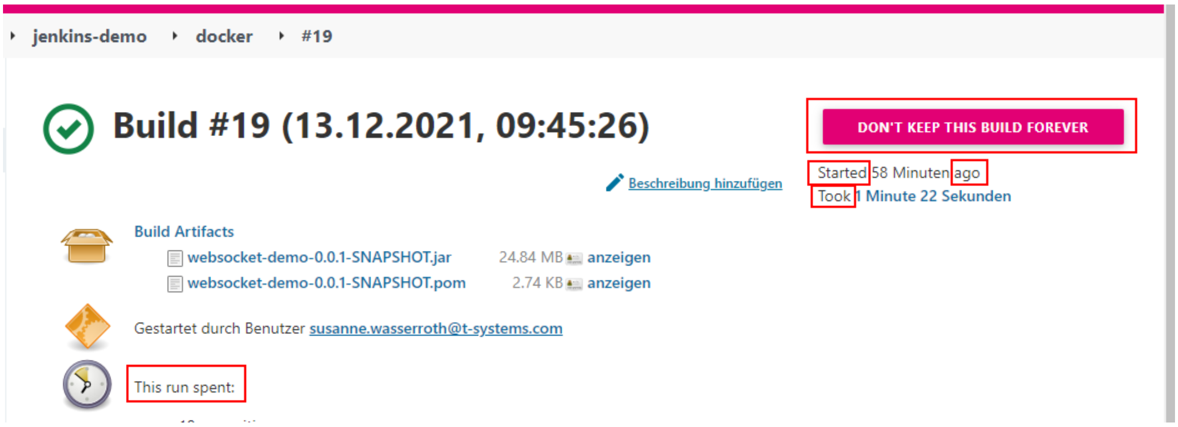


Figure 2.61: Not all menu items are translated



Build #19 (13.12.2021, 09:45:26)

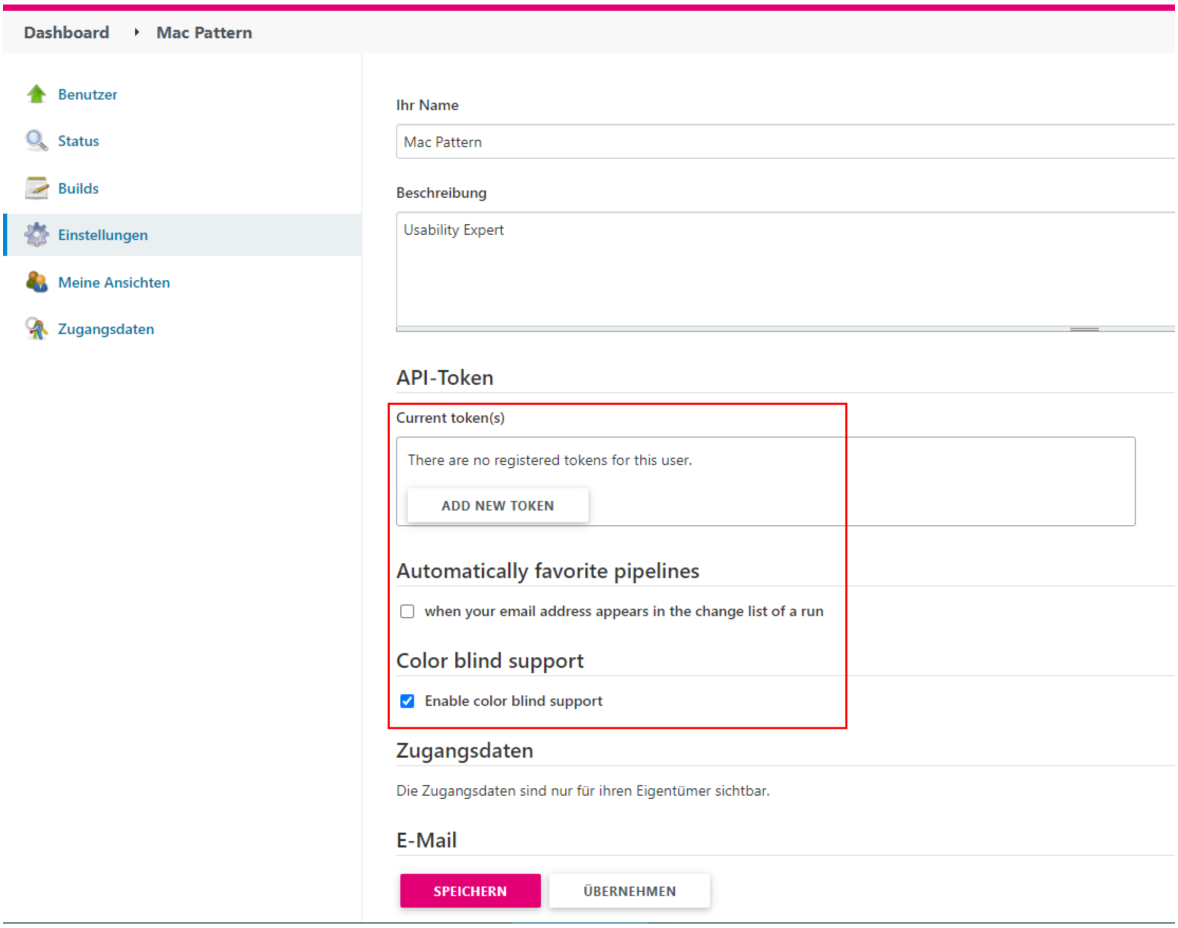
Started 58 Minuten ago
Took 1 Minute 22 Sekunden

websocket-demo-0.0.1-SNAPSHOT.jar 24.84 MB
websocket-demo-0.0.1-SNAPSHOT.pom 2.74 KB

Gestartet durch Benutzer susanne.wasserroth@t-systems.com

This run spent:

Figure 2.62: Not all texts on the build page are translated; the button also has an English name ("Don't keep...")



Dashboard ‣ Mac Pattern

- Benutzer
- Status
- Builds
- Einstellungen
- Meine Ansichten
- Zugangsdaten

Ihr Name

Mac Pattern

Beschreibung

Usability Expert

API-Token

Current token(s)

There are no registered tokens for this user.

ADD NEW TOKEN

Automatically favorite pipelines

□ when your email address appears in the change list of a run

Color blind support

☑ Enable color blind support

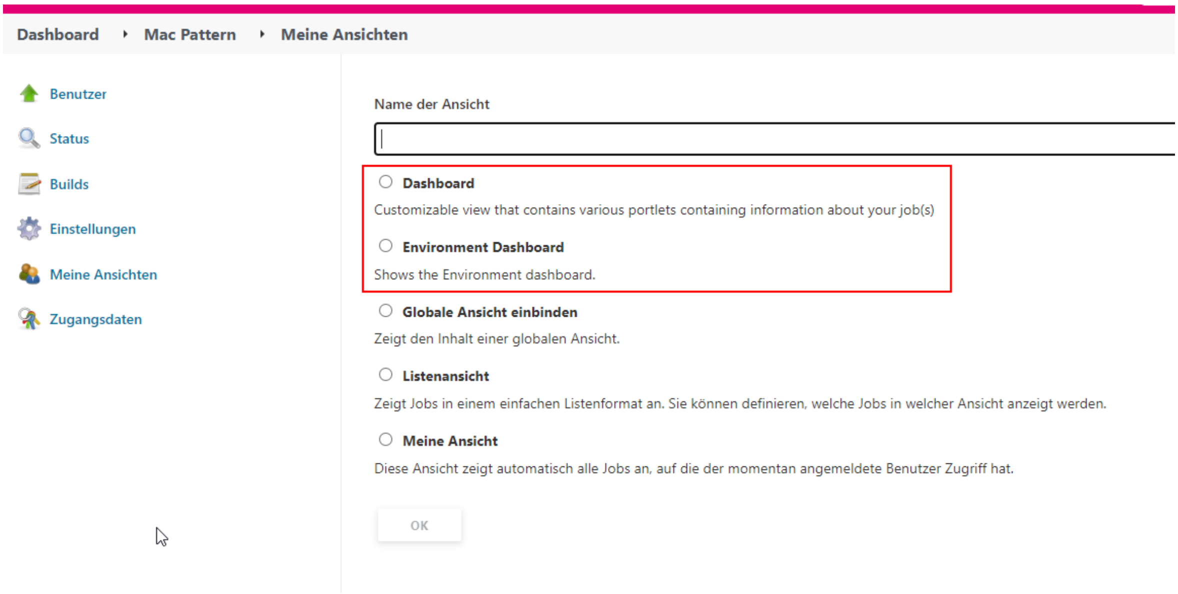
Zugangsdaten

Die Zugangsdaten sind nur für ihren Eigentümer sichtbar.

E-Mail

SPEICHERN ÜBERNEHMEN

Figure 2.63: Mix of German and English in the user settings



Dashboard ‣ Mac Pattern ‣ Meine Ansichten

- Benutzer
- Status
- Builds
- Einstellungen
- Meine Ansichten
- Zugangsdaten

Name der Ansicht

○ **Dashboard**

Customizable view that contains various portlets containing information about your job(s)

○ **Environment Dashboard**

Shows the Environment dashboard.

○ **Globale Ansicht einbinden**

Zeigt den Inhalt einer globalen Ansicht.

○ **Listenansicht**

Zeigt Jobs in einem einfachen Listenformat an. Sie können definieren, welche Jobs in welcher Ansicht anzeigt werden.

○ **Meine Ansicht**

Diese Ansicht zeigt automatisch alle Jobs an, auf die der momentan angemeldete Benutzer Zugriff hat.

OK

Figure 2.64: Mix of German and English when creating a custom view

! If English terms are technical terms and therefore not appropriately translatable, it is okay if they remain untranslated. However, this is often information that does not represent technical terms, but simply has not been fully translated.

→ The German interface should be completely and consistently translated into German become.

! Screen readers use the set language to determine the correct pronunciation of a word. When English-language terms are pronounced like German, they sometimes become incomprehensible.

→ For better understanding, the language change can be marked with the long attribute for remaining English terms.

context	Generally; See description for examples
criteria	3.1.2 Language of Individual Sections
user groups	blind people
category	impairment

A Procedure and boundary conditions

In this section, the objective, methodology and other boundary conditions of the accessibility study are explained.

A.1 Objective

The objective of the study was essentially to check compliance with standardized accessibility criteria (see Section A.3). The findings should then be summarized as an overall result on accessibility (see Management Summary). In addition, recommendations for resolving identified accessibility issues should be provided.

This should be done in the form of an expert evaluation. For this purpose, the People Unit UX (User Experience) in the Architecture & UX chapter of Deutsche Telekom IT, IT-ARC_CAa, was commissioned to design the system on the basis of generally applicable accessibility requirements based on [BITV 2.0], [WCAG 2.0], [WCAG 2.1] and [ISO 9241-171] (see Section A.3).

A.2 Methodology

The investigation was carried out in the form of a checklist-based and tool-supported expert evaluation. One or more experts examine the system in terms of accessibility requirements, which are used as test criteria and form the underlying checklist (see Section A.3).

In addition, a number of tools were used as an aid to look at specific aspects in more detail; these tools are listed in Appendix B.3.

The test specifications largely correspond to the specifications documented and validated in [BITVtest], which are based on [BITV 2.0] or [WCAG 2.0] and [WCAG 2.1].

Accessibility issues identified during the check are categorized based on their severity as a blockage, hurdle, or limitation. This includes both the effects and whether the problem can be avoided. Details can be found in Section A.4

Since it is methodically not possible to check all application parts including all ancillary functions and sub-dialogs, a focus was made on the most important pages and scenarios (application cases, use cases). This focus determines the scope of the investigation and can be found in Appendix B.2.

A.3 Accessibility Criteria

The accessibility criteria against which the application was tested are based on the Ordinance on the Creation of Accessible Information Technology according to the Disability Equality Act (Accessible Information Technology Ordinance) [BITV 2.0] or on the Web Content Accessibility Guidelines 2.0 [WCAG 2.0], which are largely identical in content.

In addition, the requirements and criteria of WCAG 2.1 that have been in force since June 2018 have been integrated [WCAG 2.1].

These criteria are structured according to the following 4 principles and 13 requirements:

Principle 1: Perceptibility

The information and components of the user interface must be presented in such a way that they can be perceived by the users.

- Requirement 1.1

  For any non-text content, alternatives must be provided in text form that can be adapted to users' needs.

- Requirement 1.2

  Alternatives are to be provided for time-triggered media.

- Requirement 1.3

  Content must be designed in such a way that it can be presented in different ways without losing information or structure.

- Requirement 1.4

  It is to be made as easy as possible for users to perceive the content and distinguish between foreground and background.

Principle 2: usability

User interface components and navigation must be operable.

- Requirement 2.1

  Accessibility via the keyboard must be ensured for the entire functionality.

- Requirement 2.2

  Users must be given sufficient time to read and use the content.

- Requirement 2.3

  Content must be designed in such a way that no epileptic seizures are triggered.

- Requirement 2.4

  The user is to be provided with orientation and navigation aids as well as aids for finding content.

- Requirement 2.5

  It is to be made easier for the user to operate the functionality by providing various input methods beyond the keyboard. (Focus: mobile devices)

Principle 3: Understandability

The information and operation of the user interface must be understandable.

- Requirement 3.1

  Text must be legible and understandable.

- Requirement 3.2

  Web pages[7]must be designed in such a way that construction and use are foreseeable.

- Requirement 3.3

  Supporting functions for the input are to be provided to avoid and correct errors.

Principle 4: Robustness

Content must be robust enough to be reliably interpreted by as many user agents as possible, including assistive technologies.

- Requirement 4.1

  Ensure compatibility with user agents, including assistive technologies.

The 50 individual test criteria8thcan be found in Appendix C.

A.4 Categorization of accessibility issues

Identified issues are assigned to three categories based on their severity. These depend on the impact of the problem and whether it can be worked around. In addition, those responsible for the application receive information about which optimizations are particularly recommended and have the greatest possible potential for improving accessibility overall.

The following applies here:

- Blockade (priority 1: very important)

  Priority 1 issues represent blockages that an affected user cannot bypass. This means that he cannot reach or operate an important function or that he cannot perceive relevant information.

  Such Prio1 problems / blockages must be remedied immediately.

- Hurdle (Priority 2: important)

  Priority 2 problems represent serious hurdles. This means that essential functions or information can only be used or perceived with difficulty or with significantly increased effort (e.g. to circumvent a blockade).

  Such Prio2 problems / hurdles should also be remedied as quickly as possible.

- Impairment (Priority 3: less important)

[7] Or: GUI masks

Priority 3 problems represent impairments. This means that the affected users are irritated or disturbed or they have to take on a small amount of additional work (e.g. making a special setting or similar).

Such Prio3 problems / impairments should also be eliminated, but the elimination is less urgent and can e.g. B. in the course of further release planning.

In Appendix E, a decision graph illustrates the classification.

A.5 Determination of the overall accessibility score

The overall result for accessibility results from the number and category (see Section A.4) of the identified accessibility problems. The following results can be achieved:

- **Very good barrier freedom/accessibility**

  Accessibility is not restricted in any way. No problems - neither impairments, nor hurdles, nor blockages - are identified.
- **Good handicap/accessibility**

  Accessibility is only slightly impaired. There are only up to a maximum of three impairments. Obstacles or blockages were not determined.

- **Limited accessibility/accessibility**

  Accessibility is limited if the application has up to three hurdles. Even if she has more than three impairments, she still has limited access. But there is no blockage.

- **Severely restricted accessibility/accessibility**

  If there are more than three hurdles, only very limited accessibility can be certified. The number of impairments is irrelevant. But there shouldn't be a blockage.

- **Poor accessibility/accessibility**

  A blockage leads to classification as an application that is difficult to access. Of course, this also applies if there are several blockages. The number of hurdles and impairments no longer plays a role.

The following table breaks down the calculation from the identified problems. The columns under the problem categories contain the respective number. A dash means the count at that point is irrelevant.

Result	**priority 1**	**Priority 2**	**Priority 3**
Accessibility is...	blockade	hurdle	impairment
🙂 Very good	0	0	0
🙂 Good	0	0	1 - 3
😐 Restricted	0	1 - 3	> 3
🙁 Highly limited	0	> 3	-
☹ Bad	> 0	-	-

Table 2.1: Calculation of the overall accessibility score from the number and category of problems identified

The same metric is used to differentiate between the individual user groups or restrictions, but only the problems that affect the respective user group are considered.

B test item and test tools

The following overview describes the examined application as well as the access and examination modalities in the inspected configuration in detail. Application and system environment, the corresponding accesses and all information about the system were provided #by the customer or technical contact person of the study #by <enter company or contact person>#.

The statements and findings in the results section in section 2 and in the management summary only relate to precisely this configuration.

B.1 Application and System Environment

System environment:	
Application	Jenkins
version / release	2.319.2
Access	https://manoni.devops.t-systems-service.com/jenkins/
Accessibility Settings	Yes (color blind support)
BF test environment:	
operating system	Windows 10 Enterprise
browsers	Google Chrome 97.0.4692.71
monitor	1920x1080

Table 2.1: Examined application and system environment

B.2 Page Selection / Scenarios

A number of representative pages and/or scenarios were identified for the experts to use as a basis for testing the application. The pages or scenarios were chosen in such a way that they depict the main use cases that are handled with the help of the system.

The following list gives an overview of the considered scenarios:

- Checking a project (branches, builds, errors in the last build)
- Create and check a new build
- Check individual build phases
- Check and change user settings

The following areas were not considered in detail:

- Configure
- my views
- the various plugins

- blue ocean

B.3 Audit Tools

The following tools were used during the investigation: #Check the versions and update the list if necessary or also delete tools that were not used#:

name (manufacturer)	**version**	**Purpose**
Microsoft Office Word	365	reporting
Microsoft Office Excel	365	Creation of the checklist
green shot	1.2.10 build 6	Creation of screenshots
Color Contrast Analyzer (The Paciello Group)	3.0.1	Examination of color contrasts
JAWS (Freedom Scientific)	2021	screen reader
ANDI servlet	-	Various exams
Web developer toolbar (Chris Pederick)	0.5.4	Various exams
Accessibility Insights for Web	2.30.1	Accessibility testing tool

Table 2.2: Tools used

C Accessibility criteria in detail

The accessibility criteria according to [BITV 2.0] [WCAG 2.0] [WCAG 2.1] are listed in detail below. The listed requirements correspond to the WCAG 2.1 criteria of levels A and AA. The statement for which user groups (restrictions) a criterion is relevant is largely based on [WCAG-Underst].

annotation

In the context of WCAG 2.1, the term “essential”, which is repeatedly mentioned in the criteria, means that the described function, property or mode of functioning is absolutely necessary and cannot be achieved in an equivalent way in any other way.

No.	Accessibility criteria	user
1.1.1 Non-Text Content	For any non-text content presented to the user, a text alternative must be provided that fulfills the purpose of that content. Text alternatives do not need to be provided in the following cases: – It is a control element or an element that accepts input from the user and has an identifier that describes its purpose. – They are timed media and text alternatives that already contain at least one descriptive explanation of the non-text content. – They are tests or exercises that must be presented in non-text format, and text alternatives that already contain at least one descriptive explanation of the non-text content are available. - Specific sensory experiences are intended to be effected and text alternatives that already include at least a descriptive explanation of the non-text content are available. – It should be achieved that a person, not a computer, accesses the content and the non-text content is explained and described by text alternatives and alternative CAPTCHAs with different output modes for different types of sensory perception are provided. – They are purely decorative elements or elements that are only used for visual design, or the non-text content is not visible to the user and these elements are set up in such a way that they can be ignored by assistive technologies .	blind people hearing sha- rendered

No.	Accessibility criteria	user
1.2.1	Recorded Audio and Video Files For recorded audio-only and video-only files that are not themselves already a media alternative for text and are clearly identified as such, the following must be provided: – For the content of the recorded audio files: text alternatives with equivalent information, – for the content of the recorded video files: text alternatives or an audio track with equivalent information.	blind people vision prevented hearing sha-rendered
1.2.2	Extended Subtitles (Captions) Extended subtitles (captions) must be provided for recorded audio content of synchronized media. This does not apply to media alternatives for text, which are clearly marked as such.	hearing sha-rendered
1.2.3	Audio Description or Full Text Alternative For pre-recorded synchronized media, a full text alternative including all interactions or an audio description shall be provided. This does not apply to media alternatives for text, which are clearly marked as such.	blind people vision prevented
1.2.4	Live Subtitles In the case of live transmissions of synchronized media, all audio content must be provided as extended subtitles (captions).	hearing sha-rendered
1.2.5	Audio Description Audio description shall be provided for all pre-recorded video content of synchronized media. This does not apply to media alternatives for text, which are clearly marked as such.	blind people vision prevented
1.3.1	Information and Relationships All of the information, structure, and relationships conveyed through layout and presentation are programmatically recognizable or available in the text.	blind people hearing sha-rendered
1.3.2	Meaningful order When the order in which the content is presented affects its meaning, the correct reading order is detectable by programs.	blind people
1.3.3	Sensory characteristics Instructions for understanding and using the content do not rely solely on sensory characteristics of the items, such as B. shape, size, visual placement, orientation or sound.	blind people vision prevented hearing sha-rendered
1.3.4 (WCAG 2.1)	Orientation The content does not limit either view or operation to a single Individual orientation of the screen, such as portrait (portrait mode) or landscape (landscape mode), unless specified	vision prevented moto fresh

No.	Accessibility criteria	user
	Alignment is essential.	cons died
1.3.5 Purpose of Entry (WCAG 2.1)	The purpose of each input field, which is intended to provide information collect about the user can be determined programmatically when - the input field serves a purpose listed under Input Purposes for UI Components (e.g. title, salutation, surname, first name, job title, surname, organization, password), and - the content is implemented using technologies that support determining the expected meaning for form input data.	vision prevented cognitive cons died, moto ric prevented
1.4.1 Color	Color shall not be used as the sole means of conveying information, indicating an action, eliciting a response, or identifying a visual element.	blind people vision prevented
1.4.2 Audio Control	There are sound elements that are automatically played for more than three seconds on a web page - either a mechanism for pausing or ending the sound, or - A mechanism to control the volume independently of the system volume.	blind people hearing sha- rendered
1.4.3 Contrast	In the visual presentation of text and type graphics, the contrast ratio between foreground and background color is at least 4.5:1. A contrast ratio of at least 3:1 applies to large letters and lettering graphics with large letters. No minimum contrast is required for incidental text and type graphics, – which are part of an inactive component of the user interface, – which are purely decorative, – which is incidental text in an image, or – which are not visible to the user. Text forming part of a logo or brand name also does not have minimum contrast requirements.	vision prevented
1.4.4 Changeable text size	Text can be enlarged up to 200% without assistive technology without loss of content or functionality.	vision prevented
1.4.5 Font Graphics	No text graphics are to be used to convey information, unless	vision prevented

No.	Accessibility criteria	user
	– These can be individually adapted to the visual needs of the user or – a specific presentation is essential for conveying the information of the text.	
1.4.10 (WCAG 2.1)	Reformatting Content may be modified without loss of information or functionality be sent and without having to scroll in two directions for - content to be scrolled vertically up to a width equivalent to 320 CSS pixels; - Content to be scrolled horizontally up to a height equivalent to 3256-CSS pixels Exceptions are pieces of content that require a two-dimensional layout for use or meaning.	vision prevented
1.4.11 (WCAG 2.1)	Non-Text Contrast The visual representation of the following items has a contrast ratio of at least 3:1 to adjacent colors on: - UI Components: Visual information required to recognize interface components and states, except for inactive components or when the component's appearance is determined by user agents and cannot be changed by the author; - Graphic objects: parts of the graphics that are necessary to understand the content, unless a specific representation of the graphic is essential to the information conveyed.	vision prevented
1.4.12 (WCAG 2.1)	Text spacing In content implemented with markup languages that contain the fol-supporting text properties, neither content nor functionality will be lost if you make the following settings without changing any other properties: - Line height at least 1.5 times the font size; - Space between paragraphs at least twice the font size; - Space between letters at least 12% of the font size; - Space between two words at least 16% of the font size. Exception: Languages and scripts that do not support one or more of these properties in the written text can only conform to the properties that exist for that language/script combination.	vision prevented
1.4.13 (WCAG 2.1)	Content on mouse-over (hover) and focus [e.g. B. Tooltips, submenus, non-modal pop-ups] If additional content appears by moving the mouse over an element ("mouse-over", "hover") or the element receives keyboard focus, then the following is guaranteed:	vision prevented motoric prevented

No.	Accessibility criteria	user
	- Hideable: A mechanism to hide/close content is available without having to move mouse cursor or keyboard focus, unless the additional content reports an input error or does not cover or replace other content; - "Hoverable": if the additional content can be displayed by mouse-over, the mouse pointer can be moved over the additional content without the content disappearing; - Persistent: The additional content remains visible until the mouse cursor or keyboard focus is removed, the user hides/closes the content, or the information is no longer valid. Exception: The visual representation of the additional content is controlled by the user agent and has not been changed by the author.	
2.1.1	Keyboard Usability All of the content's functionality must be accessible through a keyboard interface without having to adhere to specific keystroke timings. This is not true when the underlying function requires input that depends not only on the endpoints but also on the history of the user's movement.	blind people vision prevented motoric prevented
2.1.2	No Keyboard Trap If keyboard focus can be moved to an element of the page using a keyboard interface, focus must also be able to be moved away from that element using the keyboard interface. If this requires more than the standard, arrow or tab keys, the user must be informed of the method used to move the focus away.	blind people vision prevented motoric prevented
2.1.4 (WCAG 2.1)	One-character shortcut If a keyboard shortcut is in the form of just one character – letter (upper/lower case letter), number, symbol character or punctuation mark - is implemented, at least one of the following options is guaranteed: - Disable: A mechanism is available to disable the hotkey. - Remap: A mechanism is available to map the hotkey to one or more non-printable characters/keys (e.g. ctrl, alt etc.). - Active only when in focus: The hotkey for a UI component is only active when that component has focus.	motoric prevented user from language yours
2.2.1	Time-Related Requirements For any time limit imposed by content, at least one of the following must be true: – The time limit must be able to be switched off before the time runs out. – The time limit can be within a time frame that	blind people vision prevented moto fresh

No.	Accessibility criteria	user
	is at least ten times the default setting. - The user is warned that time is running out and then has at least 20 seconds to extend the duration with a simple action (e.g. pressing the spacebar). The user is given this opportunity at least ten times. There is no need to adjust the time limit if - the time limit is a necessary part of a real-time event (e.g. an auction) and there is no alternative to the intended time limit, – the time limit is necessary and extending the activity would render it invalid or – the time frame is more than 20 hours.	cons died, hearing sha- rendered
2.2.2	Stop, exit, hide Information that moves, blinks or scrolls and the – insert automatically, – last longer than five seconds and – be presented simultaneously with other content, must be capable of being paused, stopped, or hidden unless that movement is essential to an activity. Information that updates automatically and the – deploy automatically and – be presented simultaneously with other content, must be able to be paused, stopped, hidden, or controlled in the rate at which they are updated, unless such automatic updating is essential to an activity.	vision prevented
2.3.1	Three Flashes - Below Thresholds Web pages will not contain elements that flash more than three times in a one-second period, unless the flash is below the "general flash" or "red flash" threshold.	Photo-sensitive
2.4.1	Bypassing Element Groups Mechanisms are available to bypass groups of elements that are repeated on multiple web pages.	blind people vision prevented motoric prevented
2.4.2	Website Title Web pages contain titles that describe the topic or purpose of the page.	blind people vision prevented motoric prevented
2.4.3	Focus Order	blind people

No.	Accessibility criteria	user
	When the navigation sequence affects the meaning or operability of the web page, focusable components receive focus in an order that ensures that meaning and operability are preserved.	vision prevented moto ric prevented
2.4.4	Purpose of a link (in context) The aim and purpose of a link can be seen from the link text itself or from the link text in connection with the link context determined by programs.	blind people vision prevented moto ric prevented
2.4.5	Alternative Access Routes Alternative ways are offered to find content and websites within connected websites. This does not apply to pages that can only be reached via a specific procedure.	All groove crush
2.4.6	Descriptions Headings and labels indicate the topic or purpose.	blind people vision prevented moto ric prevented
2.4.7	Visible Focus A keyboard focus is always visible during keyboard operation.	moto ric prevented
2.5.1 (WCAG 2.1)	Pointing Gestures All functionalities that use multi-touch or path-based gestures zen, can also be controlled with a single pointer without path-based gestures, unless a multi-touch or path-based gesture is essential.	moto ric prevented cognitive cons died
2.5.2 (WCAG 2.1)	Canceling Pointing Gestures For functionality associated with a single pointer can be served, at least one of the following options is guaranteed: - No triggering on press/touch (down event): Simply pressing/ touching does not result in any part of the function already being triggered. - Abort or Undo: The function is executed when the pointer is released (Up event), and a mechanism is available to abort the function before execution or to undo the function after execution. - Annulment on release (Up-Event): The release (Up-Event)	All groove crush

No.	Accessibility criteria	user
	cancels the effect of the previous press/touch (down event). - Essential: The execution of the function on pressing/touching (down event) is essential.	
2.5.3 (WCAG 2.1)	Label in the name For UI components with captions containing text or images from enclose texts, the name includes the text that is represented visually.	blind people user from linguistic input
2.5.4 (WCAG 2.1)	Motion Control Functionality provided by movement of the device or movement of the User controlled can also be controlled by UI components, and motion reactions can be turned off to prevent accidental triggers unless - Assistive Interface: Motion is used to drive functionality via an accessibility-aware interface. - Essential: The movement is essential for the function and switching it off would make it impossible.	motoric prevented
3.1.1	Language The predominant natural language used on each website is programmatically recognizable.	blind people
3.1.2	Language of Individual Sections The natural language of all text passages or expressions used is recognizable by programs.	blind people
3.2.1	When focusing When a component receives focus, it does not trigger a context change.	blind people vision prevented motoric prevented
3.2.2	Upon Entry Changing the setting of an element of the user interface does not automatically lead to a change in context, unless the user has been informed of this behavior before using the element.	blind people vision prevented motoric prevented
3.2.3	Unified Navigation Navigation mechanisms that are repeated within a website appear in the same order with each repetition, unless the user initiates a change.	All groove crush

No.	Accessibility criteria	user
3.2.4	Uniform designation In a website and within linked websites, elements with the same functionality are designated uniformly.	All groove crush
3.3.1	Error Identification If an input error is detected automatically, the faulty element is shown and the error is described to the user in text form.	All groove crush
3.3.2	Captions Instructions or labels (inscriptions) must be made available for the necessary entries by users.	All groove crush
3.3.3	Suggested Corrections If an input error is detected automatically and suggestions for correction are known, these must be made available to the user, provided they do not endanger the security or purpose of the content.	All groove crush
3.3.4	Error Prevention In the case of websites that create legal obligations or lead to financial transactions by users or change or delete data in data storage systems that users can control or send test answers from users, users have at least one of the following options: – The execution can be undone. – The data entered will be checked for input errors and there is the option of correcting them if necessary. – The information can be reviewed, corrected and confirmed before it is finally sent.	All groove crush
4.1.1	Syntax Analysis Content created with markup languages consists of elements that have the following properties: – They have full start and end tags, – they are nested according to their specifications, – they do not contain duplicate attributes and – all their IDs are unique, unless their specifications allow for that particularity.	All groove zer as- sistiver techno logies
4.1.2	Name, Role, Value All user interface components are programmatically recognizable by name and role. States, properties and values that can be set by users can also be set by a program. When these states, properties, and values change, user agents, including assistive technologies, are notified.	All groove zer as- sistiver techno logies
4.1.3	Status Messages	blind people

No.	Accessibility criteria	user
(WCAG 2.1)	In content implemented with markup languages, status Messages are programmatically determined by roles or properties so that they can be presented by assistive technologies without preserving focus.	vision prevented (user assistive techno logies)

Table 2.3: Overview of the accessibility criteria

D User Groups / Restrictions

The accessibility requirements and criteria listed in this document ensure that the application can be used by different user groups subject to different restrictions.

The focus here is primarily on the users presented below. However, there are a number of other user groups, as indicated by the contents of the Users column in Table 2.3 (e.g., photosensitive, seizure-suffering, or cognitively-impaired users).

Visually Impaired Users

Visually impaired users can be impaired in a variety of ways in their visual perception. For example, they may have a different color perception or require highly magnified views of the surface. For visually impaired users, the on-screen display must be clear and flexible. Information should be available regardless of color and provide sufficient contrast between foreground and background. This is particularly important for users with poor color vision (e.g. with red-green weakness). The layout, especially the font size, should be able to be adjusted individually. A consistent arrangement of the screen elements - if possible in a "grid layout" - is important so that users can orientate themselves on "virtual" rows and columns when using assistive technologies such as magnification programs (so-called.

For clear differentiation in this study, users with low residual vision who still need a screen reader are subsumed under blind users.

Blind Users

Blind users cannot see the surface and therefore cannot position a mouse in a meaningful way. In order for blind users to have access, the pages of an application of assistive technology that replaces the graphic representation on the screen with alternative outputs (e.g. speech, braille) must be accessible. The content must therefore be able to be read correctly by so-called screen readers or output correctly by Braille keyboards. Important conditions for this are e.g. B. usable text alternatives for non-text content such as images and videos, linearizability of the pages and a semantically correct markup/use of the GUI elements. The application must also be fully controllable via keyboard.

Motorized users

Users with motor disabilities are unable to meet the high level of fine motor skills and hand-eye coordination required for mouse operation. Just like blind users, they rely on the fact that the application can be controlled entirely via the keyboard. Of course, voice control would also be conceivable. However, this is usually not yet offered by business applications.

Hearing Impaired Users

Hearing-impaired users can be more or less severely restricted in their hearing and/or completely deaf. These users cannot, or only insufficiently, perceive acoustic outputs and signals. For example, if an application uses e.g. audio signals or includes audio or video with audio output, this information must be available through alternative means (e.g. additional visual indicators or subtitles). Depending on the type of application and the content, it may also be advisable to implement content in sign language.

E Determination of the problem category

The following decision graph illustrates the categorization of the findings:

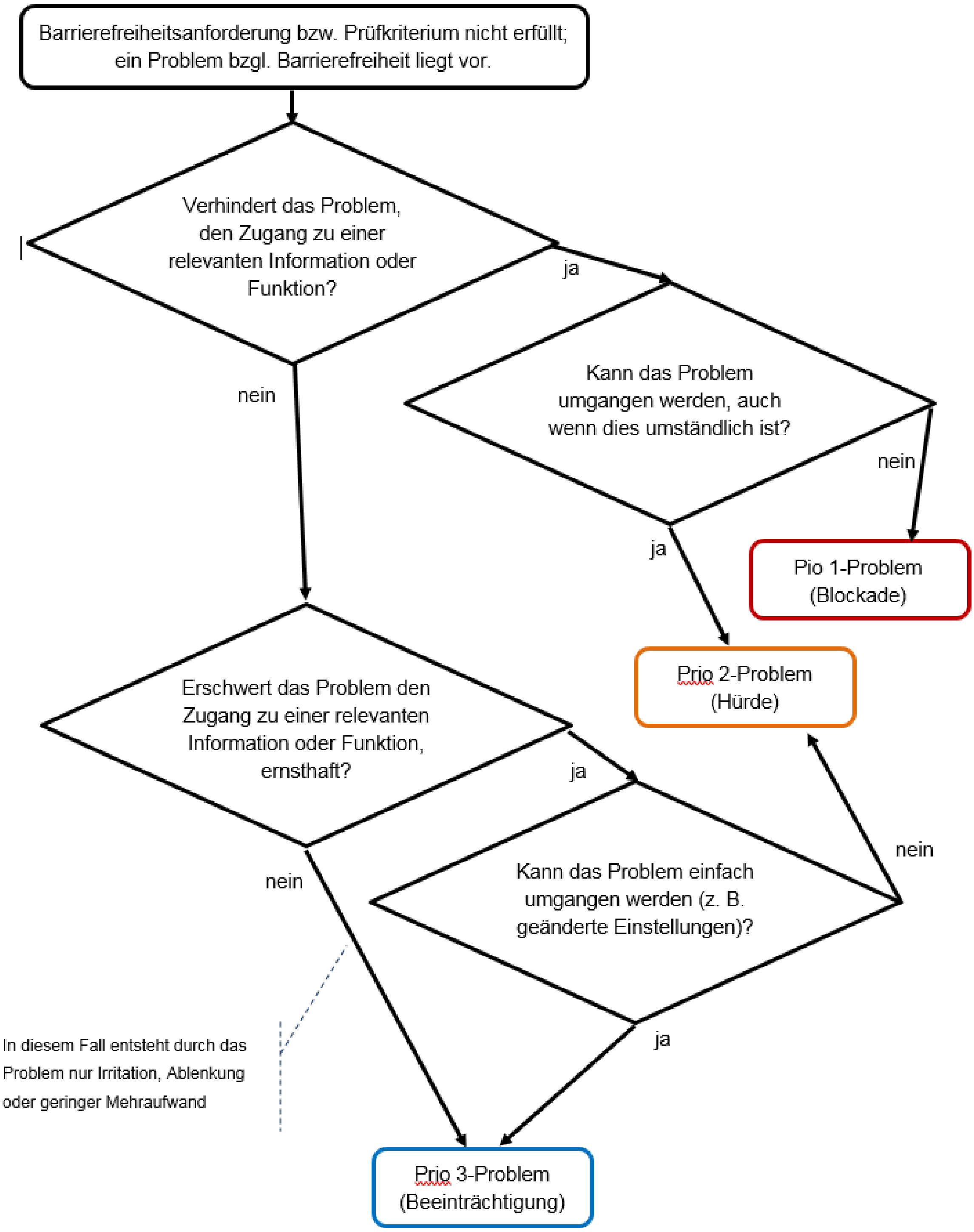

Barrierefreiheitsanforderung bzw. Prüfkriterium nicht erfüllt; ein Problem bzgl. Barrierefreiheit liegt vor.
Verhindert das Problem, den Zugang zu einer relevanten Information oder Funktion?
ja
nein
Kann das Problem umgangen werden, auch wenn dies umständlich ist?
nein
ja
Pio 1-Problem (Blockade)
Prio 2-Problem (Hürde)
Erschwert das Problem den Zugang zu einer relevanten Information oder Funktion, ernsthaft?
ja
nein
Kann das Problem einfach umgangen werden (z. B. geänderte Einstellungen)?
nein
ja
In diesem Fall entsteht durch das Problem nur Irritation, Ablenkung oder geringer Mehraufwand
Prio 3-Problem (Beeinträchtigung)

Figure 2.65: Decision graph for categorizing identified accessibility issues

Depending on the relevance of the problem for a specific user group or the source, it can be downgraded or upgraded.

F Declaration of Independence

The tests for usability (suitability for use) or accessibility (freedom from barriers) of products, services and application solutions carried out by the Usability & Accessibility Team of Deutsche Telekom IT GmbH, E-DTOPT0203, take place on the basis of DIN/ISO 9241, the "Regulation for the creation barrier-free information technology in accordance with the Disability Equality Act" (BITV 2.0) and the "Web Content Accessibility Guidelines" (WCAG 2.0/2.1) and are impartial and independent, regardless of whether the products and solutions are from T-Systems or Telekom companies -Group or other companies.

List of Figures

List of Tables

bibliography

[AC_Hellbusch] Accessibility checklist, Jan Hellbusch, http://www.hellbusch.de/accessibility-checkliste/

[BGG] Act on Equal Opportunities for People with Disabilities (Disability Equality Act - BGG), https://www.gesetze-im-internet.de/bundesrecht/bgg/gesamt.pdf

[BITV 2.0] Ordinance on the creation of barrier-free information technology in accordance with the Disability Equality Act (Barrier-free Information Technology Ordinance - BITV 2.0), http://www.gesetze-im-internet.de/bitv_2_0/BJNR184300011.html

[BITVtest] The BITV test, list of test steps, http://www.bitvtest.de/bitvtest/das_testverfahren_im_detail/pruefstufen.html

[GPII_DevSpace] Developer Space of the Global Public Inclusive Infrastructure, The onestop place to find resources, components and people to conceive, develop, test and market novel accessible solutions, https://ds.gpii.net/

[ISO-9241-11] DIN EN ISO 9241-11: Ergonomics of human-machine interaction, Part 11: Usability requirements

[ISO-9241-112] DIN EN ISO 9241-112: Ergonomics of human-machine interaction, Part 112: Principles of information presentation

[ISO-9241-110] DIN EN ISO 9241-110: Ergonomics of human-machine interaction, Part 110: Principles of dialogue design

[ISO-9241-171] DIN EN ISO 9241-171: Ergonomics of human-machine interaction, Part 171: Guidelines for the accessibility of software

[ISO-40500] ISO/IEC 40500:2012: Information technology -- W3C Web Content Accessibility Guidelines (WCAG) 2.0

[WCAG 2.0] Web Content Accessibility Guidelines (WCAG) 2.0, https://www.w3.org/TR/WCAG20/

[WCAG 2.1] Web Content Accessibility Guidelines (WCAG) 2.1' https://www.w3.org/TR/WCAG21/

[WCAG Underst] Understanding WCAG 2.0 - A guide to understanding and implementing Web Content Accessibility Guidelines 2.0. https://www.w3.org/TR/UNDERSTANDING-WCAG20/

Change History / Release Notes

Note: The latest version is valid. Older versions will automatically become invalid.

version	status	Author/Editor	Changes/comment
0.1 ff.	In Progress	Cordula Ulbricht	Initial creation and ongoing addition of content
0.8	To the review	Cordula Ulbricht	Complete Quality Assurance Document
0.9	commented	Frank Breidenstein	Document including review comments
1.0	Final	Cordula Ulbricht	Published Document

distribution list

Surname	function / company
Axel Langwald	Client / T-Systems International GmbH
Klaus Künkele	Client (representative) / T-Systems International GmbH
Ildiko Szekely	Technical contact / Deutsche Telekom Systems Solutions Hungary Kft.
Marcus Long	Product Owner for DevOps-as-a-Service / T-Systems International GmbH
Boris Folgeman	Service Manager for DevOps-as-a-Service/ T-Systems International GmbH