Test security and privacy of your mobile application (iOS & Android), detect OWASP Mobile Top 10 and other weaknesses.

Summary of Mobile Application Security Test

APP NAME	**APP ID**	**APP VERSION**
Covid Cert	ch.admin.bag.covidcertificate….	4.1.0
DEVICE TYPE	**TEST STARTED**	**TEST FINISHED**
Android	May 12th 2022, 13:20	May 12th 2022, 13:40

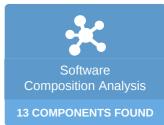| Mobile App Permissions and Privacy	OWASP Mobile Top 10 Security Test	Mobile App External Communications	Software Composition Analysis
6 PERMISSIONS	**2 MAJOR RISKS FOUND**	**RISKS FOUND**	**13 COMPONENTS FOUND**

Malware test: no malicious code or behavioral patterns detected in the mobile app.

Mobile Application Permissions and Privacy Test

If the application processes or stores any PII of EU residents, the following requirements of EU GDPR may apply:

Privacy Policy

Privacy Policy was not found in application

Misconfiguration or weakness

Mobile Application Functionality

The mobile application requests access to the following functionality that may endanger user's privacy under certain circumstances:

Camera

The mobile application can use the camera for taking pictures or videos.

Mobile Application Permissions

The mobile application requests the following permissions that may endanger user's privacy under certain circumstances:

CAMERA   dangerous

Allows application to take pictures and videos with the camera. This allows the application to collect images that the camera is seeing at any time.

ACCESS_NETWORK_STATE   normal

Allows an application to view the status of all networks.

FOREGROUND_SERVICE   normal

Allows a regular application to use Service.startForeground.

INTERNET   normal

Allows an application to create network sockets.

RECEIVE_BOOT_COMPLETED   normal

Allows an application to start itself as soon as the system has finished booting. This can make it take longer to start the phone and allow the application to slow down the overall phone by always running.

WAKE_LOCK   normal

Allows an application to prevent the phone from going to sleep.

OWASP Mobile Top 10 Security Test

The automated audit revealed the following security flaws and weaknesses that may impact the application:

HIGH RISK	MEDIUM RISK	LOW RISKS	WARNINGS
1	1	4	5

Zero false-positive SLA and advanced manual testing of application is only available in ImmuniWeb® MobileSuite.

CLEARTEXT SQLITE DATABASE [M2] [CWE-312] [DAST]   HIGH

Description:

The mobile application uses an unencrypted SQLite database.
This database can be accessed by an attacker with physical access to the mobile device or a malicious application with root access to the device. The application should not store sensitive information in clear text.

Details:

In file revoked-certificates-db:

```
TABLES:
android_metadata
revokedCertificates
sqlite_autoindex_revokedCertificates_1
room_master_table
nationalRules
sqlite_autoindex_nationalRules_1

RAW DUMP:
CREATE TABLE android_metadata (locale TEXT);CREATE TABLE `revokedCertificates`
(`certificate` TEXT NOT NULL, PRIMARY KEY(`certificate`));CREATE TABLE
room_master_table (id INTEGER PRIMARY KEY,identity_hash TEXT);CREATE TABLE
`nationalRules` (`countryCode` TEXT NOT NULL, `validUntil` INTEGER NOT NULL, `rules`
TEXT NOT NULL, `lastModified` INTEGER NOT NULL, PRIMARY KEY(`countryCode`));
```

In file androidx.work.workdb:

```
TABLES:
android_metadata
Dependency
sqlite_autoindex_Dependency_1
index_Dependency_work_spec_id
index_Dependency_prerequisite_id
WorkSpec
sqlite_autoindex_WorkSpec_1
index_WorkSpec_schedule_requested_at
index_WorkSpec_period_start_time
WorkTag
sqlite_autoindex_WorkTag_1
index_WorkTag_work_spec_id
SystemIdInfo
sqlite_autoindex_SystemIdInfo_1
WorkName
sqlite_autoindex_WorkName_1
index_WorkName_work_spec_id
WorkProgress
sqlite_autoindex_WorkProgress_1
Preference
sqlite_autoindex_Preference_1
room_master_table

RAW DUMP:
CREATE TABLE android_metadata (locale TEXT);CREATE TABLE `Dependency` (`work_spec_id`
TEXT NOT NULL, `prerequisite_id` TEXT NOT NULL, PRIMARY KEY(`work_spec_id`,
`prerequisite_id`), FOREIGN KEY(`work_spec_id`) REFERENCES `WorkSpec`(`id`) ON UPDATE
CASCADE ON DELETE CASCADE , FOREIGN KEY(`prerequisite_id`) REFERENCES `WorkSpec`(`id`)
ON UPDATE CASCADE ON DELETE CASCADE );CREATE INDEX `index_Dependency_work_spec_id` ON
`Dependency` (`work_spec_id`);CREATE INDEX `index_Dependency_prerequisite_id` ON
`Dependency` (`prerequisite_id`);CREATE TABLE `WorkSpec` (`id` TEXT NOT NULL, `state`
INTEGER NOT NULL, `worker_class_name` TEXT NOT NULL, `input_merger_class_name` TEXT,
`input` BLOB NOT NULL, `output` BLOB NOT NULL, `initial_delay` INTEGER NOT NULL,
```

```
`interval_duration` INTEGER NOT NULL, `flex_duration` INTEGER NOT NULL,
`run_attempt_count` INTEGER NOT NULL, `backoff_policy` INTEGER NOT NULL,
`backoff_delay_duration` INTEGER NOT NULL, `period_start_time` INTEGER NOT NULL,
`minimum_retention_duration` INTEGER NOT NULL, `schedule_requested_at` INTEGER NOT
NULL, `run_in_foreground` INTEGER NOT NULL, `out_of_quota_policy` INTEGER NOT NULL,
`required_network_type` INTEGER, `requires_charging` INTEGER NOT NULL,
`requires_device_idle` INTEGER NOT NULL, `requires_battery_not_low` INTEGER NOT NULL,
`requires_storage_not_low` INTEGER NOT NULL, `trigger_content_update_delay` INTEGER NOT
NULL, `trigger_max_content_delay` INTEGER NOT NULL, `content_uri_triggers` BLOB,
PRIMARY KEY(`id`));CREATE INDEX `index_WorkSpec_schedule_requested_at` ON `WorkSpec`
(`schedule_requested_at`);CREATE INDEX `index_WorkSpec_period_start_time` ON `WorkSpec`
(`period_start_time`);CREATE TABLE `WorkTag` (`tag` TEXT NOT NULL, `work_spec_id` TEXT
NOT NULL, PRIMARY KEY(`tag`, `work_spec_id`), FOREIGN KEY(`work_spec_id`) REFERENCES
`WorkSpec`(`id`) ON UPDATE CASCADE ON DELETE CASCADE );CREATE INDEX
`index_WorkTag_work_spec_id` ON `WorkTag` (`work_spec_id`);CREATE TABLE `SystemIdInfo`
(`work_spec_id` TEXT NOT NULL, `system_id` INTEGER NOT NULL, PRIMARY
KEY(`work_spec_id`), FOREIGN KEY(`work_spec_id`) REFERENCES `WorkSpec`(`id`) ON UPDATE
CASCADE ON DELETE CASCADE );CREATE TABLE `WorkName` (`name` TEXT NOT NULL,
`work_spec_id` TEXT NOT NULL, PRIMARY KEY(`name`, `work_spec_id`), FOREIGN
KEY(`work_spec_id`) REFERENCES `WorkSpec`(`id`) ON UPDATE CASCADE ON DELETE CASCADE
);CREATE INDEX `index_WorkName_work_spec_id` ON `WorkName` (`work_spec_id`);CREATE
TABLE `WorkProgress` (`work_spec_id` TEXT NOT NULL, `progress` BLOB NOT NULL, PRIMARY
KEY(`work_spec_id`), FOREIGN KEY(`work_spec_id`) REFERENCES `WorkSpec`(`id`) ON UPDATE
CASCADE ON DELETE CASCADE );CREATE TABLE `Preference` (`key` TEXT NOT NULL,
`long_value` INTEGER, PRIMARY KEY(`key`));CREATE TABLE room_master_table (id INTEGER
PRIMARY KEY,identity_hash TEXT);
```

CVSSv3 Base Score:

7.1 (AV:L/AC:L/PR:L/UI:N/S:U/C:H/I:H/A:N)

WEAK ENCRYPTION [M5] [CWE-327] [SAST]   MEDIUM

Description:

Weak or badly implemented encryption algorithms can endanger data storage and transmission used by the mobile application.

Example of insecure code:

```
Cipher c = Cipher.getInstance("AES/ECB/NoPadding");
c.init(Cipher.ENCRYPT_MODE, k, iv);
byte[] cipherText = c.doFinal(plainText);
```

Example of secure code:

```
Cipher c = Cipher.getInstance("AES/GCM/NoPadding");
c.init(Cipher.ENCRYPT_MODE, k, iv);
byte[] cipherText = c.doFinal(plainText);
```

Details:

There is **'RSA/ECB/OAEPPadding'** found in file
'ch/admin/bag/covidcertificate/wallet/transfercode/logic/TransferCodeCrypto.java':

```
[line 164:              OAEPParameterSpec oAEPParameterSpec = new
OAEPParameterSpec("SHA-256", "MGF1", new
MGF1ParameterSpec(McElieceCCA2KeyGenParameterSpec.SHA1), PSpecified.DEFAULT);]
[line 165:              Cipher instance = Cipher.getInstance("RSA/ECB/OAEPPadding",
"BC");]
[line 166:              instance.init(2, keyPair.getPrivate(), oAEPParameterSpec);]
```

There is **'RSA/ECB/OAEPWithSHA-256AndMGF1Padding'** found in file
'ch/admin/bag/covidcertificate/wallet/transfercode/logic/TransferCodeCrypto.java':

```
[line 168:              } else {]
[line 169:              Cipher instance2 = Cipher.getInstance("RSA/ECB/OAEPWithSHA-
256AndMGF1Padding");]
[line 170:              instance2.init(2, keyPair.getPrivate());]
```

CVSSv3 Base Score:

4.8 (AV:N/AC:H/PR:N/UI:N/S:U/C:L/I:L/A:N)

Reference:

- https://developer.android.com/reference/javax/crypto/Cipher.html
- http://find-sec-bugs.github.io/bugs.htm

HARDCODED DATA [M2] [CWE-200] [SAST]   `LOW`

Description:

The mobile application contains debugging or other technical information that may be extracted and used by an attacker to facilitate further attacks.

https:// with value https://www.cc-d.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 6: DEV("https://www.cc-d.bit.admin.ch/trust/", "CH01-
AppContentCertificate-ref"),]
```

https:// with value https://www.cc-a.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 7: ABN("https://www.cc-a.bit.admin.ch/trust/", "CH01-
AppContentCertificate-abn"),]
```

https:// with value https://www.cc.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 8: PROD("https://www.cc.bit.admin.ch/trust/", "CH01-
AppContentCertificate");]
```

https:// with value https://www.cc.bit.admin.ch/app/wallet/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 4: public static final String BASE_URL =
"https://www.cc.bit.admin.ch/app/wallet/v1/";]
```

https:// with value https://covidcertificate-app.bit.admin.ch/app/delivery/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 5: public static final String BASE_URL_DELIVERY =
"https://covidcertificate-app.bit.admin.ch/app/delivery/v1/";]
```

https:// with value https://covidcertificate-app.bit.admin.ch/app/transform/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 6: public static final String BASE_URL_TRANSFORMATION =
"https://covidcertificate-app.bit.admin.ch/app/transform/v1/";]
```

https:// with value https://tools.ietf.org/html/rfc7518#section-3.2 in following files:

- **io/jsonwebtoken/SignatureAlgorithm.java:**

```
[line 154:
stringBuilder.append("https://tools.ietf.org/html/rfc7518#section-3.2 for
more information.");]
[line 288: stringBuilder.append(" bits. See
https://tools.ietf.org/html/rfc7518#section-3.2 for more ");]
```

- **io/jsonwebtoken/security/Keys.java:**

```
[line 38: stringBuilder.append("https://tools.ietf.org/html/rfc7518#section-
3.2 for more information.");]
```

https:// with value https://tools.ietf.org/html/rfc7518#section-3.4 in following files:

- **io/jsonwebtoken/SignatureAlgorithm.java:**

```
[line 208:
stringBuilder.append("https://tools.ietf.org/html/rfc7518#section-3.4 for
more information.");]
[line 327:
stringBuilder2.append("https://tools.ietf.org/html/rfc7518#section-3.4 for
more information.");]
```

https:// with value https://tools.ietf.org/html/rfc7518#section- in following files:

- **io/jsonwebtoken/SignatureAlgorithm.java:**

```
[line 154:
stringBuilder.append("https://tools.ietf.org/html/rfc7518#section-3.2 for
more information.");]
[line 208:
stringBuilder.append("https://tools.ietf.org/html/rfc7518#section-3.4 for
more information.");]
[line 246:
stringBuilder4.append("https://tools.ietf.org/html/rfc7518#section-");]
[line 288: stringBuilder.append(" bits. See
https://tools.ietf.org/html/rfc7518#section-3.2 for more ");]
[line 311: stringBuilder2.append(" bits. See
https://tools.ietf.org/html/rfc7518#section-3.3 for more ");]
[line 327:
stringBuilder2.append("https://tools.ietf.org/html/rfc7518#section-3.4 for
more information.");]
```

https:// with value https://tools.ietf.org/html/rfc7518#section-3.3 in following files:

- **io/jsonwebtoken/SignatureAlgorithm.java:**

```
[line 311: stringBuilder2.append(" bits. See
https://tools.ietf.org/html/rfc7518#section-3.3 for more ");]
```

https:// with value https://github.com/jwtk/jjwt#custom-json-processor in following files:

- **io/jsonwebtoken/impl/DefaultClaims.java:**

```
[line 7: private static final String CONVERSION_ERROR_MSG = "Cannot convert
existing claim value of type '%s' to desired type '%s'. JJWT only converts
simple String, Date, Long, Integer, Short and Byte types automatically.
Anything more complex is expected to be already converted to your desired
type by the JSON Deserializer implementation. You may specify a custom
Deserializer for a JwtParser with the desired conversion configuration via
the JwtParserBuilder.deserializeJsonWith() method. See
https://github.com/jwtk/jjwt#custom-json-processor for more information. If
using Jackson, you can specify custom claim POJO types as described in
https://github.com/jwtk/jjwt#json-jackson-custom-types";]
```

http:// with value http://localhost/ in following files:

- **retrofit2/Response.java:**

```
[line 16: return success((Object) t, new
Builder().code(200).message("OK").protocol(Protocol.HTTP_1_1).request(new
Request.Builder().url("http://localhost/").build()).build());]
[line 20: return success((Object) t, new
Builder().code(i).message("Response.success()").protocol(Protocol.HTTP_1_1).
request(new Request.Builder().url("http://localhost/").build()).build());]
[line 29: return success((Object) t, new
Builder().code(200).message("OK").protocol(Protocol.HTTP_1_1).headers(header
s).request(new
Request.Builder().url("http://localhost/").build()).build());]
[line 41: return error(responseBody, new Builder().body(new
NoContentResponseBody(responseBody.contentType(),
responseBody.contentLength())).code(i).message("Response.error()").protocol(
Protocol.HTTP_1_1).request(new
Request.Builder().url("http://localhost/").build()).build());]
```

http:// with value http://javax.xml.XMLConstants/feature/secure-processing in following files:

- **com/fasterxml/jackson/databind/ext/DOMDeserializer.java:**

```
[line 44: r3 = "http://javax.xml.XMLConstants/feature/secure-processing";]
```

CVSSv3 Base Score:

3.3 (AV:L/AC:L/PR:L/UI:N/S:U/C:L/I:N/A:N)

INFORMATION EXPOSURE [M2] [CWE-200] [SAST]   LOW

Description:

The mobile application contains hardcoded URLs that may be from development, staging or preproduction hosts or APIs. Attackers can potentially increase the external attack surface with this information.

https:// with value https://www.cc-d.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 6: DEV("https://www.cc-d.bit.admin.ch/trust/", "CH01-
AppContentCertificate-ref"),]
```

https:// with value https://www.cc-a.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 7: ABN("https://www.cc-a.bit.admin.ch/trust/", "CH01-
AppContentCertificate-abn"),]
```

https:// with value https://www.cc.bit.admin.ch/trust/ in following files:

- **ch/admin/bag/covidcertificate/sdk/android/SdkEnvironment.java:**

```
[line 8: PROD("https://www.cc.bit.admin.ch/trust/", "CH01-
AppContentCertificate");]
```

https:// with value https://www.cc.bit.admin.ch/app/wallet/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 4: public static final String BASE_URL =
"https://www.cc.bit.admin.ch/app/wallet/v1/";]
```

https:// with value https://covidcertificate-app.bit.admin.ch/app/delivery/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 5: public static final String BASE_URL_DELIVERY =
"https://covidcertificate-app.bit.admin.ch/app/delivery/v1/";]
```

https:// with value https://covidcertificate-app.bit.admin.ch/app/transform/v1/ in following files:

- **ch/admin/bag/covidcertificate/wallet/BuildConfig.java:**

```
[line 6: public static final String BASE_URL_TRANSFORMATION =
"https://covidcertificate-app.bit.admin.ch/app/transform/v1/";]
```

CVSSv3 Base Score:

3.3 (AV:L/AC:L/PR:L/UI:N/S:U/C:L/I:N/A:N)

MISSING TAPJACKING PROTECTION [M1] [CWE-451] [SAST]　　　　　　　　　　　LOW

Description:

The mobile application does not have a tapjacking protection required to mitigate tapjacking attacks.
By default, Android OS permits a mobile application to display its user interface over the user interface of another application installed and run on the device. When user touches the screen, application may pass the touch event to another application below its user interface layer that the user does not see, serving like a proxy to pass unintended touch activities. This attack is quite similar to clickjacking but for mobile devices. In order to be successfully exploited, a malicious application shall be already installed on the mobile phone of the victim. An example of exploitation would be a malware app that tricks user to unwittingly tap on a payment button (or any other functionality) of a sensitive application when playing a game or doing other innocent activity in the malicious application screen.

Example of secure code:

```
public class MyActivity extends Activity {
    protected void onCreate(Bundle bundle) {
        super.onCreate(bundle);

        final Button myButton = (Button)findViewById(R.id.button_id);
        myButton.setFilterTouchesWhenObscured(true);

        myButton.setOnClickListener(new View.OnClickListener() {
            // Perform action on click
        }
    }
}

<Button
    android:layout_height="wrap_content"
    android:layout_width="wrap_content"
    android:text="@string/self_destruct"
    android:onClick="selfDestruct"
    android:filterTouchesWhenObscured="true" />
```

Details:

There is **android:filterTouchesWhenObscured="true"** missing in files:

- android/res/layout-watch/abc_alert_dialog_button_bar_material.xml
- android/res/layout-watch/abc_alert_dialog_title_material.xml
- android/res/layout-land/material_clock_period_toggle_land.xml
- android/res/layout-land/mtrl_picker_header_dialog.xml
- android/res/layout-land/material_timepicker.xml
- android/res/layout/view_transfer_code_bubble.xml
- android/res/layout/text_view_with_theme_line_height.xml
- android/res/layout/mtrl_picker_text_input_date.xml
- android/res/layout/item_detail_value_without_label.xml
- android/res/layout/item_detail_mode_refresh.xml
- android/res/layout/mtrl_alert_dialog_actions.xml
- android/res/layout/abc_list_menu_item_checkbox.xml
- android/res/layout/item_debug_certificate_list.xml
- android/res/layout/item_header_not_empty.xml
- android/res/layout/item_transfer_code_list.xml
- android/res/layout/design_layout_snackbar_include.xml
- android/res/layout/dialog_fragment_info_box.xml
- android/res/layout/design_text_input_start_icon.xml
- android/res/layout/material_clock_period_toggle.xml
- android/res/layout/abc_alert_dialog_button_bar_material.xml
- android/res/layout/mtrl_picker_header_fullscreen.xml
- android/res/layout/abc_activity_chooser_view_list_item.xml
- android/res/layout/fragment_certificate_detail.xml
- android/res/layout/text_view_with_line_height_from_layout.xml
- android/res/layout/design_layout_tab_icon.xml
- android/res/layout/abc_screen_content_include.xml
- android/res/layout/item_mode_list_info.xml
- android/res/layout/mtrl_picker_dialog.xml
- android/res/layout/abc_activity_chooser_view.xml
- android/res/layout/item_error_status.xml
- android/res/layout/abc_select_dialog_material.xml
- android/res/layout/view_transfer_code.xml
- android/res/layout/test_toolbar_elevation.xml
- android/res/layout/abc_action_bar_title_item.xml
- android/res/layout/mtrl_calendar_year.xml
- android/res/layout/mtrl_alert_dialog_title.xml
- android/res/layout/test_toolbar.xml
- android/res/layout/fragment_faq.xml
- android/res/layout/abc_screen_toolbar.xml
- android/res/layout/text_view_with_line_height_from_appearance.xml
- android/res/layout/material_timepicker_textinput_display.xml
- android/res/layout/fragment_pdf_export.xml
- android/res/layout/material_time_input.xml
- android/res/layout/abc_dialog_title_material.xml
- android/res/layout/mtrl_picker_header_dialog.xml
- android/res/layout/abc_search_view.xml
- android/res/layout/abc_search_dropdown_item_icons_2line.xml
- android/res/layout/abc_action_menu_item_layout.xml
- android/res/layout/design_bottom_sheet_dialog.xml
- android/res/layout/fragment_onboarding_agb.xml
- android/res/layout/material_chip_input_combo.xml
- android/res/layout/material_clock_display.xml
- android/res/layout/fragment_qr_scan.xml
- android/res/layout/mtrl_calendar_months.xml
- android/res/layout/fragment_onboarding_content.xml
- android/res/layout/design_bottom_navigation_item.xml
- android/res/layout/abc_action_bar_up_container.xml

- android/res/layout/notification_template_icon_group.xml
- android/res/layout/abc_list_menu_item_layout.xml
- android/res/layout/design_text_input_end_icon.xml
- android/res/layout/material_timepicker_dialog.xml
- android/res/layout/m3_alert_dialog_actions.xml
- android/res/layout/design_navigation_item_separator.xml
- android/res/layout/mtrl_calendar_day_of_week.xml
- android/res/layout/material_clockface_textview.xml
- android/res/layout/mtrl_picker_header_toggle.xml
- android/res/layout/dialog_camera_permission_explanation.xml
- android/res/layout/mtrl_calendar_month_navigation.xml
- android/res/layout/test_reflow_chipgroup.xml
- android/res/layout/material_radial_view_group.xml
- android/res/layout/mtrl_calendar_month.xml
- android/res/layout/notification_action_tombstone.xml
- android/res/layout/item_faq_question.xml
- android/res/layout/fragment_home.xml
- android/res/layout/fragment_vaccination_appointment.xml
- android/res/layout/item_foreign_rules_check_hint.xml
- android/res/layout/item_certificate_list.xml
- android/res/layout/m3_alert_dialog.xml
- android/res/layout/fragment_certificates_list.xml
- android/res/layout/abc_action_menu_layout.xml
- android/res/layout/notification_template_part_time.xml
- android/res/layout/notification_action.xml
- android/res/layout/abc_list_menu_item_radio.xml
- android/res/layout/mtrl_layout_snackbar_include.xml
- android/res/layout/custom_dialog.xml
- android/res/layout/mtrl_calendar_horizontal.xml
- android/res/layout/fragment_transfer_code_intro.xml
- android/res/layout/item_vaccination_appointment_canton.xml
- android/res/layout/fragment_certificate_light_conversion.xml
- android/res/layout/material_clock_display_divider.xml
- android/res/layout/fragment_settings.xml
- android/res/layout/mtrl_alert_select_dialog_multichoice.xml
- android/res/layout/item_detail_modes_list.xml
- android/res/layout/dialog_fragment_certificate_banner_info.xml
- android/res/layout/test_toolbar_custom_background.xml
- android/res/layout/abc_screen_simple_overlay_action_mode.xml
- android/res/layout/mtrl_calendar_vertical.xml
- android/res/layout/abc_popup_menu_item_layout.xml
- android/res/layout/view_transfer_code_waiting.xml
- android/res/layout/mtrl_picker_header_title_text.xml
- android/res/layout/mtrl_picker_fullscreen.xml
- android/res/layout/design_menu_item_action_area.xml
- android/res/layout/select_dialog_singlechoice_material.xml
- android/res/layout/item_detail_divider.xml
- android/res/layout/fragment_foreign_validity.xml
- android/res/layout/fragment_certificate_add.xml
- android/res/layout/dialog_fragment_mode_info.xml
- android/res/layout/select_dialog_item_material.xml
- android/res/layout/activity_onboarding.xml
- android/res/layout/item_detail_title.xml
- android/res/layout/fragment_html.xml
- android/res/layout/design_navigation_menu.xml
- android/res/layout/mtrl_picker_header_selection_text.xml
- android/res/layout/item_language_option.xml
- android/res/layout/test_action_chip.xml

- android/res/layout/test_chip_zero_corner_radius.xml
- android/res/layout/test_navigation_bar_item_layout.xml
- android/res/layout/material_timepicker.xml
- android/res/layout/support_simple_spinner_dropdown_item.xml
- android/res/layout/material_time_chip.xml
- android/res/layout/item_detail_mode.xml
- android/res/layout/abc_alert_dialog_material.xml
- android/res/layout/mtrl_alert_select_dialog_item.xml
- android/res/layout/fragment_how_to_scan.xml
- android/res/layout/fragment_transfer_code_detail.xml
- android/res/layout/design_navigation_item.xml
- android/res/layout/abc_tooltip.xml
- android/res/layout/abc_action_mode_bar.xml
- android/res/layout/fragment_certificate_pager.xml
- android/res/layout/design_navigation_item_header.xml
- android/res/layout/test_design_checkbox.xml
- android/res/layout/mtrl_picker_text_input_date_range.xml
- android/res/layout/test_design_radiobutton.xml
- android/res/layout/item_header.xml
- android/res/layout/design_layout_snackbar.xml
- android/res/layout/mtrl_calendar_month_labeled.xml
- android/res/layout/item_faq_header.xml
- android/res/layout/fragment_transfer_code_howto.xml
- android/res/layout/abc_action_mode_close_item_material.xml
- android/res/layout/test_toolbar_surface.xml
- android/res/layout/fragment_updateboarding_certificate_light.xml
- android/res/layout/design_navigation_item_subheader.xml
- android/res/layout/abc_list_menu_item_icon.xml
- android/res/layout/fragment_rat_conversion.xml
- android/res/layout/item_detail_value.xml
- android/res/layout/partial_home_add_certificate_options.xml
- android/res/layout/fragment_onboarding_intro.xml
- android/res/layout/material_textinput_timepicker.xml
- android/res/layout/abc_expanded_menu_layout.xml
- android/res/layout/abc_cascading_menu_item_layout.xml
- android/res/layout/activity_main.xml
- android/res/layout/mtrl_navigation_rail_item.xml
- android/res/layout/item_faq_intro_section.xml
- android/res/layout/fragment_transfer_code_pager.xml
- android/res/layout/mtrl_calendar_days_of_week.xml
- android/res/layout/text_view_without_line_height.xml
- android/res/layout/material_clockface_view.xml
- android/res/layout/mtrl_calendar_day.xml
- android/res/layout/fragment_certificate_light_pager.xml
- android/res/layout/fragment_debug.xml
- android/res/layout/mtrl_layout_snackbar.xml
- android/res/layout/design_navigation_menu_item.xml
- android/res/layout/notification_template_custom_big.xml
- android/res/layout/text_view_with_line_height_from_style.xml
- android/res/layout/fragment_transfer_code_creation.xml
- android/res/layout/mtrl_alert_select_dialog_singlechoice.xml
- android/res/layout/fragment_certificate_light_detail.xml
- android/res/layout/abc_popup_menu_header_item_layout.xml
- android/res/layout/abc_alert_dialog_title_material.xml
- android/res/layout/notification_template_part_chronometer.xml
- android/res/layout/mtrl_alert_dialog.xml
- android/res/layout/dialog_fragment_refresh_button_info.xml
- android/res/layout/mtrl_picker_actions.xml

- android/res/layout/abc_screen_simple.xml
- android/res/layout/m3_alert_dialog_title.xml
- android/res/layout/select_dialog_multichoice_material.xml
- android/res/layout/design_layout_tab_text.xml
- android/res/layout-ldrtl/material_textinput_timepicker.xml
- android/res/layout-sw600dp/design_layout_snackbar.xml
- android/res/layout-sw600dp/mtrl_layout_snackbar.xml
- android/res/layout-v26/abc_screen_toolbar.xml
- android/res/layout-v26/mtrl_calendar_month.xml

There is **'extends FrameLayout'** found in file 'ch/admin/bag/covidcertificate/common/views/WindowInsetsLayout.java':

```
[line 17: /* compiled from: WindowInsetsLayout.kt */]
[line 18: public final class WindowInsetsLayout extends FrameLayout {]
[line 19:     public static final Companion Companion = new Companion();]
```

There is **'extends FrameLayout'** found in file 'ch/ubique/qrscanner/view/QrScannerView.java':

```
[line 43: /* compiled from: QrScannerView.kt */]
[line 44: public final class QrScannerView extends FrameLayout {]
[line 45:     private boolean autoActivateOnAttach;]
```

There is **'extends LinearLayout'** found in file 'ch/admin/bag/covidcertificate/wallet/transfercode/view/TransferCodeView.java':

```
[line 22: /* compiled from: TransferCodeView.kt */]
[line 23: public final class TransferCodeView extends LinearLayout {]
[line 24:     public static final Companion Companion = new Companion();]
```

CVSSv3 Base Score:

3.3 (AV:L/AC:H/PR:L/UI:R/S:U/C:L/I:L/A:N)

Reference:

- https://developer.android.com/guide/topics/ui/declaring-layout.html
- https://developer.android.com/guide/topics/resources/layout-resource.html
- https://blog.lookout.com/blog/2010/12/09/android-touch-event-hijacking/

EXPORTED ACTIVITIES [M1] [CWE-926] [SAST]   LOW

Description:

The mobile application contains exported activities that can be loaded and executed by other applications residing on the mobile device, including malicious ones, to trigger a legitimate application activity.
An activity is an Android component that allows to interact with the application in a particular way (e.g. perform certain actions or functions).

Example of insecure code:

```
<activity
    android:name=".SomeActivity"
    ....
    android:exported="true" />
```

Example of secure code:

```
<activity
    android:name=".SomeActivity"
    ....
    android:exported="false" />
```

Details:

There is **'MainActivity'** found in file 'android/AndroidManifest.xml':

```
[line 14:            <activity android:exported="true"
android:name="ch.admin.bag.covidcertificate.wallet.MainActivity"
android:screenOrientation="portrait">]
```

CVSSv3 Base Score:

3.6 (AV:L/AC:H/PR:L/UI:N/S:U/C:L/I:L/A:N)

Reference:

- https://developer.android.com/reference/android/app/Activity.html
- https://developer.android.com/guide/topics/manifest/activity-element.html

TEMPORARY FILE CREATION [SAST]   WARNING

Description:

The mobile application creates temporary files. Despite that cache files are usually private by default, it is recommended to make sure that temporary files are securely deleted when they are not required by the application anymore.

Details:

There is **'createTempFile()'** found in file 'ch/admin/bag/covidcertificate/wallet/pdf/PdfViewModel$importPdf$1.java':

```
[line 53:              InputStream openInputStream =
this.this$0.getApplication().getContentResolver().openInputStream(this.$uri);]
[line 54:              File createTempFile = File.createTempFile("certificate",
PdfViewModel.PDF_FILE_EXTENSION, this.this$0.getApplication().getCacheDir());]
[line 55:              Intrinsics.checkNotNullExpressionValue(createTempFile,
"createTempFile(\"certific…<Application>().cacheDir)");]
[line 56:              if (openInputStream != null) {]
```

There is **'createTempFile()'** found in file 'ch/admin/bag/covidcertificate/wallet/pdf/export/PdfExportFragment.java':

```
[line 224:              stringBuilder.append("-certificate");]
[line 225:              file = File.createTempFile(stringBuilder.toString(),
PdfViewModel.PDF_FILE_EXTENSION, file);]
[line 226:              Intrinsics.checkNotNullExpressionValue(file, "pdfFile");]
```

There is **'createTempFile()'** found in file 'kotlin/io/FilesKt__UtilsKt.java':

```
[line 32:          Intrinsics.checkNotNullParameter(str, "prefix");]
[line 33:          File createTempFile = File.createTempFile(str, str2, file);]
[line 34:          createTempFile.delete();]
```

```
[line 55:          }]
[line 56:          return createTempFile(str, str2, file);]
[line 57:       }]
```

```
[line 59:     @Deprecated(message = "Avoid creating temporary files in the default temp
location with this function due to too wide permissions on the newly created file. Use
kotlin.io.path.createTempFile instead or resort to java.io.File.createTempFile.")]
[line 60:     public static final File createTempFile(String str, String str2, File
file) {]
[line 61:          Intrinsics.checkNotNullParameter(str, "prefix");]
[line 62:          File createTempFile = File.createTempFile(str, str2, file);]
[line 63:          Intrinsics.checkNotNullExpressionValue(createTempFile,
"createTempFile(prefix, suffix, directory)");]
[line 64:          return createTempFile;]
```

There is **'createTempFile()'** found in file 'kotlin/io/path/PathsKt__PathUtilsKt.java':

```
[line 675:           Intrinsics.checkNotNullParameter(fileAttributeArr, "attributes");]
[line 676:           Path createTempFile = Files.createTempFile(str, str2,
(FileAttribute[]) Arrays.copyOf(fileAttributeArr, fileAttributeArr.length));]
[line 677:           Intrinsics.checkNotNullExpressionValue(createTempFile,
"createTempFile(prefix, suffix, *attributes)");]
[line 678:           return createTempFile;]
```

```
[line 680: ]
[line 681:     private static final Path createTempFile(String str, String str2,
FileAttribute<?>... fileAttributeArr) throws IOException {]
[line 682:         Intrinsics.checkNotNullParameter(fileAttributeArr, "attributes");]
[line 683:         Path createTempFile = Files.createTempFile(str, str2,
(FileAttribute[]) Arrays.copyOf(fileAttributeArr, fileAttributeArr.length));]
[line 684:         Intrinsics.checkNotNullExpressionValue(createTempFile,
"createTempFile(prefix, suffix, *attributes)");]
[line 685:         return createTempFile;]
```

```
[line 694:         }]
[line 695:         return createTempFile(path, str, str2, fileAttributeArr);]
[line 696:     }]
[line 697: ]
[line 698:     public static final Path createTempFile(Path path, String str, String
str2, FileAttribute<?>... fileAttributeArr) throws IOException {]
[line 699:         Intrinsics.checkNotNullParameter(fileAttributeArr, "attributes");]
[line 700:         if (path != null) {]
[line 701:             path = Files.createTempFile(path, str, str2, (FileAttribute[])
Arrays.copyOf(fileAttributeArr, fileAttributeArr.length));]
[line 702:             Intrinsics.checkNotNullExpressionValue(path,
"createTempFile(directory…fix, suffix, *attributes)");]
[line 703:             return path;]
[line 704:         }]
[line 705:         path = Files.createTempFile(str, str2, (FileAttribute[])
Arrays.copyOf(fileAttributeArr, fileAttributeArr.length));]
[line 706:         Intrinsics.checkNotNullExpressionValue(path, "createTempFile(prefix,
suffix, *attributes)");]
[line 707:         return path;]
```

Reference:

- https://developer.android.com/training/basics/data-storage/files.html

USAGE OF INTENT FILTER [M1] [CWE-927] [SAST]   WARNING

Description:

The mobile application uses an intent filter that may be a serious security risk if not properly implemented and filtered. Developers should not solely rely on intent filters for security purposes because they place no restrictions on explicit intents. Intent filters are defined in the Android Manifest file, they let developers choose which type of intents their application components are supposed to receive and handle.

Example of insecure code:

```
<intent-filter>
    <action android:name="android.intent.action.VIEW" />
    <action android:name="android.intent.action.EDIT" />
    <action android:name="android.intent.action.PICK" />
    <category android:name="android.intent.category.DEFAULT" />
    <data mimeType:name="vnd.android.cursor.dir/vnd.google.note" />
</intent-filter>
```

Example of secure code:

```
// When you use intent-filter, you have to perform input validation in your code.
```

Details:

There is **'<intent-filter>'** found in file 'android/AndroidManifest.xml':

```
[line 14:          <activity android:exported="true"
android:name="ch.admin.bag.covidcertificate.wallet.MainActivity"
android:screenOrientation="portrait">]
[line 15:             <intent-filter>]
[line 16:                 <action android:name="android.intent.action.MAIN"/>]
```

```
[line 18:             </intent-filter>]
[line 19:             <intent-filter>]
[line 20:                 <action android:name="android.intent.action.SEND"/>]
```

```
[line 23:             </intent-filter>]
[line 24:             <intent-filter>]
[line 25:                 <action android:name="android.intent.action.VIEW"/>]
```

```
[line 45:          <receiver android:directBootAware="false" android:enabled="false"
android:exported="false"
android:name="androidx.work.impl.background.systemalarm.ConstraintProxy$BatteryCharging
Proxy">]
[line 46:             <intent-filter>]
[line 47:                 <action
android:name="android.intent.action.ACTION_POWER_CONNECTED"/>]
```

```
[line 51:          <receiver android:directBootAware="false" android:enabled="false"
android:exported="false"
android:name="androidx.work.impl.background.systemalarm.ConstraintProxy$BatteryNotLowPr
oxy">]
[line 52:             <intent-filter>]
[line 53:                 <action android:name="android.intent.action.BATTERY_OKAY"/>]
```

```
[line 57:          <receiver android:directBootAware="false" android:enabled="false"
android:exported="false"
android:name="androidx.work.impl.background.systemalarm.ConstraintProxy$StorageNotLowPr
oxy">]
[line 58:              <intent-filter>]
[line 59:                  <action
android:name="android.intent.action.DEVICE_STORAGE_LOW"/>]
```

```
[line 63:          <receiver android:directBootAware="false" android:enabled="false"
android:exported="false"
android:name="androidx.work.impl.background.systemalarm.ConstraintProxy$NetworkStatePro
xy">]
[line 64:              <intent-filter>]
[line 65:                  <action
android:name="android.net.conn.CONNECTIVITY_CHANGE"/>]
```

```
[line 68:          <receiver android:directBootAware="false" android:enabled="false"
android:exported="false"
android:name="androidx.work.impl.background.systemalarm.RescheduleReceiver">]
[line 69:              <intent-filter>]
[line 70:                  <action
android:name="android.intent.action.BOOT_COMPLETED"/>]
```

```
[line 75:          <receiver android:directBootAware="false"
android:enabled="@bool/enable_system_alarm_service_default" android:exported="false"
android:name="androidx.work.impl.background.systemalarm.ConstraintProxyUpdateReceiver">
]
[line 76:              <intent-filter>]
[line 77:                  <action
android:name="androidx.work.impl.background.systemalarm.UpdateProxies"/>]
```

```
[line 80:          <receiver android:directBootAware="false" android:enabled="true"
android:exported="true"
android:name="androidx.work.impl.diagnostics.DiagnosticsReceiver"
android:permission="android.permission.DUMP">]
[line 81:              <intent-filter>]
[line 82:                  <action
android:name="androidx.work.diagnostics.REQUEST_DIAGNOSTICS"/>]
```

Reference:

- https://developer.android.com/guide/components/intents-filters.html
- https://developer.android.com/training/articles/security-tips.html

DYNAMIC LOAD OF CODE [M7] [CWE-94] [SAST]   WARNING

Description:

The mobile application uses dynamic load of executable code. Under certain circumstances, dynamic load of code can be dangerous. For example, if the code is located on an external storage (e.g. SD card), this can lead to code injection vulnerability if the external storage is world readable and/or writable and an attacker can access it.

Example of insecure code:

```
Object test = loader.loadClass("Test", true).newInstance();
```

Example of secure code:

```
// If you are using code from unsafe place (like external storage),
// you should sign and cryptographically verify your code.
```

Details:

There is **'ClassLoader'** found in file 'j$/time/zone/ZoneRulesProvider.java':

```
[line 57:                         try {}
[line 58:                             ZoneRulesProvider zoneRulesProvider =
(ZoneRulesProvider) cls.cast(Class.forName(property, true,
cls.getClassLoader()).newInstance());]
[line 59:
ZoneRulesProvider.registerProvider(zoneRulesProvider);]
```

There is **'ClassLoader'** found in file 'io/jsonwebtoken/impl/lang/Services.java':

```
[line 10: public final class Services {]
[line 11:     private static final List<ClassLoaderAccessor> CLASS_LOADER_ACCESSORS =
Collections.arrayToList(new ClassLoaderAccessor[]{new ClassLoaderAccessor() {]
[line 12:         public ClassLoader getClassLoader() {]
[line 13:             return Thread.currentThread().getContextClassLoader();]
[line 14:         }]
[line 15:     }, new ClassLoaderAccessor() {]
[line 16:         public ClassLoader getClassLoader() {]
[line 17:             return Services.class.getClassLoader();]
[line 18:         }]
[line 19:     }, new ClassLoaderAccessor() {]
[line 20:         public ClassLoader getClassLoader() {]
[line 21:             return ClassLoader.getSystemClassLoader();]
[line 22:         }]
```

```
[line 24: ]
[line 25:     private interface ClassLoaderAccessor {]
[line 26:         ClassLoader getClassLoader();]
[line 27:     }]
```

```
[line 33:         Assert.notNull(cls, "Parameter 'spi' must not be null.");]
[line 34:         for (ClassLoaderAccessor ClassLoader : CLASS_LOADER_ACCESSORS) {]
[line 35:             List loadAll = loadAll(cls, classLoader.getClassLoader());]
[line 36:             if (!loadAll.isEmpty()) {]
```

```
[line 42: ]
[line 43:    private static <T> List<T> loadAll(Class<T> cls, ClassLoader ClassLoader)
{]
[line 44:        ServiceLoader load = ServiceLoader.load(cls, ClassLoader);]
[line 45:        ArrayList arrayList = new ArrayList();]
```

```
[line 54:        Assert.notNull(cls, "Parameter 'spi' must not be null.");]
[line 55:        for (ClassLoaderAccessor ClassLoader : CLASS_LOADER_ACCESSORS) {]
[line 56:            Object loadFirst = loadFirst(cls, classLoader.getClassLoader());]
[line 57:            if (loadFirst != null) {]
```

```
[line 63: ]
[line 64:    private static <T> T loadFirst(Class<T> cls, ClassLoader ClassLoader) {]
[line 65:        ServiceLoader load = ServiceLoader.load(cls, ClassLoader);]
[line 66:        return load.iterator().hasNext() ? load.iterator().next() : null;]
```

There is **'ClassLoader'** found in file 'io/jsonwebtoken/lang/Classes.java':

```
[line 7: public final class Classes {]
[line 8:    private static final ClassLoaderAccessor CLASS_CL_ACCESSOR = new
ExceptionIgnoringAccessor() {]
[line 9:        /* Access modifiers changed, original: protected */]
[line 10:        public ClassLoader doGetClassLoader() throws Throwable {]
[line 11:            return Classes.class.getClassLoader();]
[line 12:        }]
[line 13:    };]
[line 14:    private static final ClassLoaderAccessor SYSTEM_CL_ACCESSOR = new
ExceptionIgnoringAccessor() {]
[line 15:        /* Access modifiers changed, original: protected */]
[line 16:        public ClassLoader doGetClassLoader() throws Throwable {]
[line 17:            return ClassLoader.getSystemClassLoader();]
[line 18:        }]
[line 19:    };]
[line 20:    private static final ClassLoaderAccessor THREAD_CL_ACCESSOR = new
ExceptionIgnoringAccessor() {]
[line 21:        /* Access modifiers changed, original: protected */]
[line 22:        public ClassLoader doGetClassLoader() throws Throwable {]
[line 23:            return Thread.currentThread().getContextClassLoader();]
[line 24:        }]
```

```
[line 26: ]
[line 27:    private interface ClassLoaderAccessor {]
[line 28:        InputStream getResourceStream(String str);]
```

```
[line 32: ]
[line 33:     private static abstract class ExceptionIgnoringAccessor implements
ClassLoaderAccessor {]
[line 34:         public abstract ClassLoader doGetClassLoader() throws Throwable;]
[line 35:]
```

```
[line 43:        public Class loadClass(String str) {]
[line 44:          ClassLoader classLoader = getClassLoader();]
[line 45:          if (ClassLoader != null) {]
[line 46:            try {]
[line 47:               return ClassLoader.loadClass(str);]
[line 48:            } catch (ClassNotFoundException unused) {]
```

```
[line 54:        public InputStream getResourceStream(String str) {]
[line 55:          ClassLoader classLoader = getClassLoader();]
[line 56:          return classLoader != null ? ClassLoader.getResourceAsStream(str)
: null;]
[line 57:        }]
```

```
[line 59:        /* Access modifiers changed, original: protected|final */]
[line 60:        public final ClassLoader getClassLoader() {]
[line 61:          try {]
[line 62:            return doGetClassLoader();]
[line 63:          } catch (Throwable unused) {]
```

```
[line 86:        stringBuilder.append("] from the thread context, current, or ");]
[line 87:        stringBuilder.append("system/application ClassLoaders.  All
heuristics have been exhausted.  Class could not be found.");]
[line 88:        String stringBuilder2 = stringBuilder.toString();]
```

There is **'ClassLoader'** found in file 'kotlin/internal/PlatformImplementationsKt.java':

```
[line 19:        r1 = "ClassCastException(\"Inst…baseTypeCL\").initCause(e)";]
[line 20:        r2 = ", base type ClassLoader: ";]
[line 21:        r3 = "Instance ClassLoader: ";]
[line 22:        r4 = "forName(\"kotlin.internal…entations\").newInstance()";]
```

```
[line 34:        r5 = r5.getClass();     Catch:{ ClassNotFoundException -> 0x0055 }]
[line 35:        r5 = r5.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0055 }]
[line 36:        r7 = kotlin.internal.PlatformImplementations.class;]
[line 37:        r7 = r7.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0055 }]
[line 38:        r8 = new java.lang.ClassCastException;          Catch:{
ClassNotFoundException -> 0x0055 }]
```

```
[line 60:          r5 = r5.getClass();    Catch:{ ClassNotFoundException -> 0x0099 }]
[line 61:          r5 = r5.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0099 }]
[line 62:          r7 = kotlin.internal.PlatformImplementations.class;]
[line 63:          r7 = r7.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0099 }]
[line 64:          r8 = new java.lang.ClassCastException;         Catch:{
ClassNotFoundException -> 0x0099 }]
```

```
[line 90:          r0 = r0.getClass();    Catch:{ ClassNotFoundException -> 0x00e3 }]
[line 91:          r0 = r0.getClassLoader();      Catch:{ ClassNotFoundException ->
0x00e3 }]
[line 92:          r6 = kotlin.internal.PlatformImplementations.class;]
[line 93:          r6 = r6.getClassLoader();      Catch:{ ClassNotFoundException ->
0x00e3 }]
[line 94:          r7 = new java.lang.ClassCastException;         Catch:{
ClassNotFoundException -> 0x00e3 }]
```

```
[line 117:          r0 = r0.getClass();   Catch:{ ClassNotFoundException -> 0x0127 }]
[line 118:          r0 = r0.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0127 }]
[line 119:          r5 = kotlin.internal.PlatformImplementations.class;]
[line 120:          r5 = r5.getClassLoader();      Catch:{ ClassNotFoundException ->
0x0127 }]
[line 121:          r6 = new java.lang.ClassCastException;         Catch:{
ClassNotFoundException -> 0x0127 }]
```

```
[line 149:          } catch (ClassCastException e) {]
[line 150:          ClassLoader classLoader = obj.getClass().getClassLoader();]
[line 151:          Intrinsics.reifiedOperationMarker(4, str);]
[line 152:          ClassLoader classLoader2 = Object.class.getClassLoader();]
[line 153:          StringBuilder stringBuilder = new StringBuilder();]
[line 154:          stringBuilder.append("Instance ClassLoader: ");]
[line 155:          stringBuilder.append(ClassLoader);]
[line 156:          stringBuilder.append(", base type ClassLoader: ");]
[line 157:          stringBuilder.append(ClassLoader2);]
[line 158:          Throwable initCause = new
ClassCastException(stringBuilder.toString()).initCause(e);]
```

There is **'ClassLoader'** found in file 'kotlin/concurrent/ThreadsKt.java':

```
[line 7: ]
[line 8: @Metadata(d1 =
{"\u0000:\n\u0000\n\u0002\u0018\u0002\n\u0000\n\u0002\u0010\u000b\n\u0002\b\u0002\n\u00
02\u0018\u0002\n\u0000\n\u0002\u0010\u000e\n\u0000\n\u0002\u0010\b\n\u0000\n\u0002\u001
8\u0002\n\u0002\u0010\u0002\n\u0002\b\u0002\n\u0002\u0010\u0000\n\u0002\u0018\u0002\n\u
0002\b\u0003\u001aJ\u0010\u0000\u001a\u00020\u00012\b\b\u0002\u0010\u0002\u001a\u00020\
u00032\b\b\u0002\u0010\u0004\u001a\u00020\u00032\n\b\u0002\u0010\u0005\u001a\u0004\u001
8\u00010\u00062\n\b\u0002\u0010\u0007\u001a\u0004\u0018\u00010\b2\b\b\u0002\u0010\t\u00
1a\u00020\n2\f\u0010\u000b\u001a\b\u0012\u0004\u0012\u00020\r0\f\u001a3\u0010\u000e\u00
1a\u0002H\u000f\"\b\b\u0000\u0010\u000f*\u00020\u0010*\b\u0012\u0004\u0012\u0002H\u000f
0\u00112\f\u0010\u0012\u001a\b\u0012\u0004\u0012\u0002H\u000f0\fH\u0087\bø\u0001\u0000¢
\u0006\u0002\u0010\u0013\u0002\u0007\n\u0005\b20\u0001¨\u0006\u0014"}, d2 =
{"thread", "Ljava/lang/Thread;", "start", "", "isDaemon", "contextClassLoader",
"Ljava/lang/ClassLoader;", "name", "", "priority", "", "block", "Lkotlin/Function0;",
"", "getOrSet", "T", "", "Ljava/lang/ThreadLocal;", "default", "
(Ljava/lang/ThreadLocal;Lkotlin/jvm/functions/Function0;)Ljava/lang/Object;", "kotlin-
stdlib"}, k = 2, mv = {1, 6, 0}, xi = 48)]
[line 9: /* compiled from: Thread.kt */]
[line 10: public final class ThreadsKt {]
[line 11:     public static /* synthetic */ Thread thread$default(boolean z, boolean
z2, ClassLoader ClassLoader, String str, int i, Function0 function0, int i2, Object
obj) {]
[line 12:         if ((i2 & 1) != 0) {]
```

```
[line 19:         boolean z4 = z2;]
[line 20:         ClassLoader classLoader2 = (i2 & 4) != 0 ? null : ClassLoader;]
[line 21:         String str2 = (i2 & 8) != 0 ? null : str;]
```

```
[line 24:         }]
[line 25:         return thread(z3, z4, ClassLoader2, str2, i, function0);]
[line 26:     }]
[line 27: ]
[line 28:     public static final Thread thread(boolean z, boolean z2, ClassLoader
ClassLoader, String str, int i, Function0<Unit> function0) {]
[line 29:         Intrinsics.checkNotNullParameter(function0, "block");]
```

```
[line 39:         }]
[line 40:         if (ClassLoader != null) {]
[line 41:             threadsKt$thread$thread$1.setContextClassLoader(ClassLoader);]
[line 42:         }]
```

There is **'ClassLoader'** found in file 'kotlin/coroutines/jvm/internal/ModuleNameRetriever.java':

```
[line 60:          try {]
[line 61:              Cache cache = new
Cache(Class.class.getDeclaredMethod("getModule", new Class[0]),
baseContinuationImpl.getClass().getClassLoader().loadClass("java.lang.Module").getDecla
redMethod("getDescriptor", new Class[0]),
baseContinuationImpl.getClass().getClassLoader().loadClass("java.lang.module.ModuleDesc
riptor").getDeclaredMethod("name", new Class[0]));]
[line 62:              cache = cache;]
```

There is **'ClassLoader'** found in file 'retrofit2/Retrofit.java':

```
[line 179:          validateServiceInterface(cls);]
[line 180:          return Proxy.newProxyInstance(cls.getClassLoader(), new Class[]
{cls}, new InvocationHandler() {]
[line 181:              private final Object[] emptyArgs = new Object[0];]
```

There is **'ClassLoader'** found in file 'com/squareup/moshi/Types.java':

```
[line 254:          } else if (cls.getDeclaredMethods().length == 0) {]
[line 255:             return (Annotation) Proxy.newProxyInstance(cls.getClassLoader(),
new Class[]{cls}, new InvocationHandler() {]
[line 256:               public Object invoke(Object obj, Method method, Object[]
objArr) throws Throwable {]
```

There is **'ClassLoader'** found in file 'com/squareup/moshi/internal/Util.java':

```
[line 616:          r0 = com.squareup.moshi.Types.generatedJsonAdapterName(r0);]
[line 617:          r8 = r8.getClassLoader();    Catch:{ ClassNotFoundException ->
0x00fb, NoSuchMethodException -> 0x00b0, IllegalAccessException -> 0x0098,
InstantiationException -> 0x0080, InvocationTargetException -> 0x007a }]
[line 618:          r2 = 1;]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/databind/ObjectMapper.java':

```
[line 599: ]
[line 600:     public static List<Module> findModules(ClassLoader ClassLoader) {]
[line 601:          ArrayList arrayList = new ArrayList();]
[line 602:          Iterator it = secureGetServiceLoader(Module.class,
ClassLoader).iterator();]
[line 603:          while (it.hasNext()) {]
```

```
[line 608: ]
[line 609:     private static <T> ServiceLoader<T> secureGetServiceLoader(final
Class<T> cls, final ClassLoader ClassLoader) {]
[line 610:          if (System.getSecurityManager() != null) {]
```

```
[line 612:                    public ServiceLoader<T> run() {]
[line 613:                        ClassLoader classLoader = ClassLoader;]
[line 614:                        return classLoader == null ? ServiceLoader.load(cls) :
ServiceLoader.load(cls, ClassLoader);]
[line 615:                }]
```

```
[line 617:        }]
[line 618:        return classLoader == null ? ServiceLoader.load(cls) :
ServiceLoader.load(cls, ClassLoader);]
[line 619:    }]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/databind/util/ClassUtil.java':

```
[line 822:            NoClassDefFoundError e2 = e;]
[line 823:            ClassLoader contextClassLoader =
Thread.currentThread().getContextClassLoader();]
[line 824:            if (contextClassLoader == null) {]
[line 825:                return _failGetClassMethods(cls2, e2);]
```

```
[line 827:            try {]
[line 828:                e2 = contextClassLoader.loadClass(cls2.getName());]
[line 829:                cls2 = e2.getDeclaredMethods();]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/databind/cfg/MapperBuilder.java':

```
[line 231: ]
[line 232:     public static List<Module> findModules(ClassLoader ClassLoader) {]
[line 233:         ArrayList arrayList = new ArrayList();]
[line 234:         Iterator it = secureGetServiceLoader(Module.class,
ClassLoader).iterator();]
[line 235:         while (it.hasNext()) {]
```

```
[line 240: ]
[line 241:     private static <T> ServiceLoader<T> secureGetServiceLoader(final
Class<T> cls, final ClassLoader ClassLoader) {]
[line 242:         if (System.getSecurityManager() != null) {]
```

```
[line 244:                    public ServiceLoader<T> run() {]
[line 245:                        ClassLoader classLoader = ClassLoader;]
[line 246:                        return classLoader == null ? ServiceLoader.load(cls) :
ServiceLoader.load(cls, ClassLoader);]
[line 247:                }]
```

```
[line 249:        }]
[line 250:        return classLoader == null ? ServiceLoader.load(cls) :
ServiceLoader.load(cls, ClassLoader);]
[line 251:    }]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/databind/type/TypeFactory.java':

```
[line 54:      private static final long serialVersionUID = 1;]
[line 55:      protected final ClassLoader _ClassLoader;]
[line 56:      protected final TypeModifier[] _modifiers;]
```

```
[line 106:          this._modifiers = null;]
[line 107:          this._ClassLoader = null;]
[line 108:      }]
```

```
[line 110:      @Deprecated]
[line 111:      protected TypeFactory(LRUMap<Object, JavaType> lRUMap, TypeParser
typeParser, TypeModifier[] typeModifierArr, ClassLoader ClassLoader) {]
[line 112:          this((LookupCache) lRUMap, typeParser, typeModifierArr,
ClassLoader);]
[line 113:      }]
[line 114: ]
[line 115:      protected TypeFactory(LookupCache<Object, JavaType> lookupCache,
TypeParser typeParser, TypeModifier[] typeModifierArr, ClassLoader ClassLoader) {]
[line 116:          LookupCache lookupCache2;]
```

```
[line 122:          this._modifiers = typeModifierArr;]
[line 123:          this._classLoader = ClassLoader;]
[line 124:      }]
```

```
[line 139:          }]
[line 140:          return new TypeFactory(lookupCache, this._parser, typeModifierArr,
this._ClassLoader);]
[line 141:      }]
[line 142: ]
[line 143:      public TypeFactory withClassLoader(ClassLoader ClassLoader) {]
[line 144:          return new TypeFactory(this._typeCache, this._parser,
this._modifiers, ClassLoader);]
[line 145:      }]
```

```
[line 148:      public TypeFactory withCache(LRUMap<Object, JavaType> lRUMap) {]
[line 149:          return new TypeFactory((LRUMap) lRUMap, this._parser,
this._modifiers, this._ClassLoader);]
[line 150:      }]
```

```
[line 152:      public TypeFactory withCache(LookupCache<Object, JavaType> lookupCache)
{]
[line 153:          return new TypeFactory((LookupCache) lookupCache, this._parser,
this._modifiers, this._ClassLoader);]
[line 154:      }]
```

```
[line 163: ]
[line 164:     public ClassLoader getClassLoader() {]
[line 165:          return this._ClassLoader;]
[line 166:       }]
```

```
[line 186:          Throwable th = null;]
[line 187:          ClassLoader classLoader = getClassLoader();]
[line 188:          if (ClassLoader == null) {]
[line 189:             classLoader = Thread.currentThread().getContextClassLoader();]
[line 190:          }]
[line 191:          if (ClassLoader != null) {]
[line 192:            try {]
[line 193:                str = classForName(str, true, ClassLoader);]
[line 194:                return str;]
```

```
[line 210:     /* Access modifiers changed, original: protected */]
[line 211:     public Class<?> classForName(String str, boolean z, ClassLoader
ClassLoader) throws ClassNotFoundException {]
[line 212:          return Class.forName(str, true, ClassLoader);]
[line 213:       }]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/databind/jsontype/impl/SubTypeValidator.java':

```
[line 35:          hashSet.add("org.apache.tomcat.dbcp.dbcp2.BasicDataSource");]
[line 36:          hashSet.add("com.sun.org.apache.bcel.internal.util.ClassLoader");]
[line 37:          hashSet.add("org.hibernate.jmx.StatisticsService");]
```

There is **'ClassLoader'** found in file 'com/fasterxml/jackson/core/util/VersionUtil.java':

```
[line 33:          r1 = 1;]
[line 34:          r3 = r3.getClassLoader();       Catch:{ Exception -> 0x004d }]
[line 35:          r3 = java.lang.Class.forName(r0, r1, r3);       Catch:{ Exception ->
0x004d }]
```

```
[line 71:     @Deprecated]
[line 72:     public static Version mavenVersionFor(ClassLoader ClassLoader, String
str, String str2) {]
[line 73:          StringBuilder stringBuilder = new StringBuilder();]
```

```
[line 80:          Version stringBuilder2 = stringBuilder.toString();]
[line 81:          InputStream resourceAsStream =
ClassLoader.getResourceAsStream(stringBuilder2);]
[line 82:          if (resourceAsStream != null) {]
```

Reference:

- https://developer.android.com/reference/java/lang/ClassLoader.html
- https://developer.android.com/reference/dalvik/system/DexClassLoader.html
- https://developer.android.com/reference/java/security/SecureClassLoader.html

- https://developer.android.com/reference/java/net/URLClassLoader.html

OBJECT DESERIALIZATION FOUND [M7] [CWE-502] [SAST]　　　　　`WARNING`

Description:

Object deserialization performed on an untrusted resource (e.g. user-supplied input or external storage), can be dangerous if the data for deserialization is tampered by an attacker.

Example of insecure code:

```
bundle.putSerializable("exampleClass", exampleOfSerializabledClass);
exampleOfSerializabledClass = bundle.getSerializable("exampleClass");
```

Example of secure code:

```
// Use only serialization when you have the control over data
```

Details:

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/Curve.java':

```
[line 5: ]
[line 6: public class Curve implements Serializable {]
[line 7:     private static final long serialVersionUID = 4578920872509827L;]
```

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/Field.java':

```
[line 4: ]
[line 5: public class Field implements Serializable {]
[line 6:     private static final long serialVersionUID = 8746587465875676L;]
```

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/GroupElement.java':

```
[line 7: ]
[line 8: public class GroupElement implements Serializable {]
[line 9:     private static final long serialVersionUID = 2395879087349587L;]
```

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/FieldElement.java':

```
[line 4: ]
[line 5: public abstract class FieldElement implements Serializable {]
[line 6:     private static final long serialVersionUID = 1239527465875676L;]
```

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/bigint/BigIntegerLittleEndianEncoding.java':

```
[line 8: ]
[line 9: public class BigIntegerLittleEndianEncoding extends Encoding implements Serializable {]
[line 10:     private static final long serialVersionUID = 3984579843759837L;]
```

There is **'implements Serializable'** found in file 'net/i2p/crypto/eddsa/math/bigint/BigIntegerFieldElement.java':

```
[line 7: ]
[line 8: public class BigIntegerFieldElement extends FieldElement implements
Serializable {]
[line 9:    private static final long serialVersionUID = 4890398908392808L;]
```

There is **'implements Serializable'** found in file 'j$/time/ZoneId.java':

```
[line 15: ]
[line 16: public abstract class ZoneId implements Serializable {]
[line 17:    public static final Map SHORT_IDS;]
```

There is **'implements Serializable'** found in file 'j$/time/Clock.java':

```
[line 6: ]
[line 7:    static final class SystemClock extends Clock implements Serializable {]
[line 8:       private final ZoneId zone;]
```

There is **'implements Serializable'** found in file 'j$/time/temporal/WeekFields.java':

```
[line 19: ]
[line 20: public final class WeekFields implements Serializable {]
[line 21:    private static final ConcurrentMap CACHE = new ConcurrentHashMap(4,
0.75f, 2);]
```

There is **'implements Serializable'** found in file 'j$/time/temporal/ValueRange.java':

```
[line 6: ]
[line 7: public final class ValueRange implements Serializable {]
[line 8:    private final long maxLargest;]
```

There is **'implements Serializable'** found in file 'j$/time/chrono/IsoChronology.java':

```
[line 4: ]
[line 5: public final class IsoChronology extends AbstractChronology implements
Serializable {]
[line 6:    public static final IsoChronology INSTANCE = new IsoChronology();]
```

There is **'implements Serializable'** found in file 'j$/time/zone/ZoneRules.java':

```
[line 18: ]
[line 19: public final class ZoneRules implements Serializable {]
[line 20:    private static final ZoneOffsetTransitionRule[] EMPTY_LASTRULES = new
ZoneOffsetTransitionRule[0];]
```

There is **'implements Serializable'** found in file 'j$/time/zone/ZoneOffsetTransitionRule.java':

```
[line 4: ]
[line 5: public abstract class ZoneOffsetTransitionRule implements Serializable {]
[line 6: }]
```

There is **'implements Serializable'** found in file 'ch/admin/bag/covidcertificate/common/config/EolBannerInfoModel.java':

```
[line 10: /* compiled from: EolBannerInfoModel.kt */]
[line 11: public final class EolBannerInfoModel implements Serializable {]
[line 12:     private final String detailHexColor;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/common/config/RefreshButtonInfoModel.java':

```
[line 11: /* compiled from: RefreshButtonInfoModel.kt */]
[line 12: public final class RefreshButtonInfoModel implements Serializable {]
[line 13:     private final String fatTitle;]
```

There is **'implements Serializable'** found in file 'ch/admin/bag/covidcertificate/common/html/BuildInfo.java':

```
[line 8: /* compiled from: BuildInfo.kt */]
[line 9: public final class BuildInfo implements Serializable {]
[line 10:     private final String agbUrl;]
```

There is **'implements Serializable'** found in file 'ch/admin/bag/covidcertificate/sdk/core/models/state/ModeValidity.java':

```
[line 8: /* compiled from: CheckModeRulesState.kt */]
[line 9: public final class ModeValidity implements Serializable {]
[line 10:     private final String mode;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/core/models/healthcert/PersonName.java':

```
[line 12: /* compiled from: PersonName.kt */]
[line 13: public final class PersonName implements Serializable {]
[line 14:     private final String familyName;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/core/models/healthcert/CertificateHolder.java':

```
[line 13: /* compiled from: CertificateHolder.kt */]
[line 14: public final class CertificateHolder implements Serializable {]
[line 15:     private CertType certType;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/core/models/healthcert/eu/RecoveryEntry.java':

```
[line 12: /* compiled from: RecoveryEntry.kt */]
[line 13: public final class RecoveryEntry implements Serializable {]
[line 14:     private final String certificateIdentifier;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/core/models/healthcert/eu/VaccinationEntry.java':

```
[line 12: /* compiled from: VaccinationEntry.kt */]
[line 13: public final class VaccinationEntry implements Serializable {]
[line 14:     private final String certificateIdentifier;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/core/models/healthcert/eu/TestEntry.java':

```
[line 12: /* compiled from: TestEntry.kt */]
[line 13: public final class TestEntry implements Serializable {]
[line 14:     private final String certificateIdentifier;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/sdk/android/models/VerifierCertificateHolder.java':

```
[line 10: /* compiled from: VerifierCertificateHolder.kt */]
[line 11: public final class VerifierCertificateHolder implements Serializable {]
[line 12:     private final CertificateHolder internalCertificateHolder;]
```

There is **'implements Serializable'** found in file
'ch/admin/bag/covidcertificate/wallet/transfercode/model/TransferCodeModel.java':

```
[line 13: /* compiled from: TransferCodeModel.kt */]
[line 14: public final class TransferCodeModel implements Serializable {]
[line 15:     private final String code;]
```

There is **'implements Serializable'** found in file 'kotlin/Pair.java':

```
[line 7: /* compiled from: Tuples.kt */]
[line 8: public final class Pair<A, B> implements Serializable {]
[line 9:     private final A first;]
```

There is **'implements Serializable'** found in file 'kotlin/Triple.java':

```
[line 7: /* compiled from: Tuples.kt */]
[line 8: public final class Triple<A, B, C> implements Serializable {]
[line 9:     private final A first;]
```

There is **'implements Serializable'** found in file 'kotlin/Result.java':

```
[line 10: /* compiled from: Result.kt */]
[line 11: public final class Result<T> implements Serializable {]
[line 12:     public static final Companion Companion = new Companion();]
```

```
[line 36:     /* compiled from: Result.kt */]
[line 37:     public static final class Failure implements Serializable {]
[line 38:         public final Throwable exception;]
```

There is **'implements Serializable'** found in file 'kotlin/jvm/internal/Ref.java':

```
[line 6: ]
[line 7:     public static final class BooleanRef implements Serializable {]
[line 8:         public boolean element;]
```

```
[line 14: ]
[line 15:     public static final class ByteRef implements Serializable {]
[line 16:         public byte element;]
```

```
[line 22: ]
[line 23:     public static final class CharRef implements Serializable {]
[line 24:         public char element;]
```

```
[line 30: ]
[line 31:     public static final class DoubleRef implements Serializable {]
[line 32:         public double element;]
```

```
[line 38: ]
[line 39:     public static final class FloatRef implements Serializable {]
[line 40:         public float element;]
```

```
[line 46: ]
[line 47:     public static final class IntRef implements Serializable {]
[line 48:         public int element;]
```

```
[line 54: ]
[line 55:     public static final class LongRef implements Serializable {]
[line 56:         public long element;]
```

```
[line 62: ]
[line 63:     public static final class ObjectRef<T> implements Serializable {]
[line 64:         public T element;]
```

```
[line 70: ]
[line 71:     public static final class ShortRef implements Serializable {]
[line 72:         public short element;]
```

There is **'implements Serializable'** found in file 'kotlin/jvm/internal/CallableReference.java':

```
[line 24: ]
[line 25:     private static class NoReceiver implements Serializable {]
[line 26:         private static final NoReceiver INSTANCE = new NoReceiver();]
```

There is **'implements Serializable'** found in file 'kotlin/coroutines/CombinedContext.java':

```
[line 22:     /* compiled from: CoroutineContextImpl.kt */]
[line 23:     private static final class Serialized implements Serializable {]
[line 24:         public static final Companion Companion = new Companion();]
```

There is **'implements Serializable'** found in file 'kotlin/text/Regex.java':

```
[line 19: /* compiled from: Regex.kt */]
[line 20: public final class Regex implements Serializable {]
[line 21:      public static final Companion Companion = new Companion();]
```

```
[line 60:      /* compiled from: Regex.kt */]
[line 61:      private static final class Serialized implements Serializable {]
[line 62:          public static final Companion Companion = new Companion();]
```

There is **'implements Serializable'** found in file 'kotlin/random/XorWowRandom.java':

```
[line 8: /* compiled from: XorWowRandom.kt */]
[line 9: public final class XorWowRandom extends Random implements Serializable {]
[line 10:      private static final Companion Companion = new Companion();]
```

There is **'implements Serializable'** found in file 'kotlin/random/Random.java':

```
[line 16:      /* compiled from: Random.kt */]
[line 17:      public static final class Default extends Random implements Serializable
{]
[line 18:]
```

```
[line 20:          /* compiled from: Random.kt */]
[line 21:          private static final class Serialized implements Serializable {]
[line 22:              public static final Serialized INSTANCE = new Serialized();]
```

There is **'implements Serializable'** found in file 'kotlin/random/PlatformRandom.java':

```
[line 10: /* compiled from: PlatformRandom.kt */]
[line 11: final class PlatformRandom extends AbstractPlatformRandom implements
Serializable {]
[line 12:      private static final Companion Companion = new Companion();]
```

There is **'implements Serializable'** found in file 'com/squareup/moshi/LinkedHashTreeMap.java':

```
[line 16: ]
[line 17: final class LinkedHashTreeMap<K, V> extends AbstractMap<K, V> implements
Serializable {]
[line 18:      static final /* synthetic */ boolean $assertionsDisabled = false;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/DeserializationConfig.java':

```
[line 30: ]
[line 31: public final class DeserializationConfig extends
MapperConfigBase<DeserializationFeature, DeserializationConfig> implements Serializable
{]
[line 32:      private static final int DESER_FEATURE_DEFAULTS =
MapperConfig.collectFeatureDefaults(DeserializationFeature.class);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/PropertyNamingStrategies.java':

```
[line 9: ]
[line 10: public abstract class PropertyNamingStrategies implements Serializable {]
[line 11:     public static final PropertyNamingStrategy KEBAB_CASE = new
KebabCaseStrategy();]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/JavaType.java':

```
[line 11: ]
[line 12: public abstract class JavaType extends ResolvedType implements Serializable,
Type {]
[line 13:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/DeserializationContext.java':

```
[line 55: ]
[line 56: public abstract class DeserializationContext extends DatabindContext
implements Serializable {]
[line 57:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/PropertyName.java':

```
[line 9: ]
[line 10: public class PropertyName implements Serializable {]
[line 11:     public static final PropertyName NO_NAME;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/JsonMappingException.java':

```
[line 25: ]
[line 26:     public static class Reference implements Serializable {]
[line 27:         private static final long serialVersionUID = 2;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ObjectMapper.java':

```
[line 208: ]
[line 209:     public static class DefaultTypeResolverBuilder extends
StdTypeResolverBuilder implements Serializable {]
[line 210:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/PropertyMetadata.java':

```
[line 6: ]
[line 7: public class PropertyMetadata implements Serializable {]
[line 8:     public static final PropertyMetadata STD_OPTIONAL = new
PropertyMetadata(Boolean.FALSE, null, null, null, null, null, null);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/SerializationConfig.java':

```
[line 24: ]
[line 25: public final class SerializationConfig extends
MapperConfigBase<SerializationFeature, SerializationConfig> implements Serializable {]
[line 26:      protected static final PrettyPrinter DEFAULT_PRETTY_PRINTER = new
DefaultPrettyPrinter();]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/InjectableValues.java':

```
[line 9: ]
[line 10:      public static class Std extends InjectableValues implements Serializable
{]
[line 11:          private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/PropertyNamingStrategy.java':

```
[line 9: ]
[line 10: public class PropertyNamingStrategy implements Serializable {]
[line 11:      @Deprecated]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ObjectWriter.java':

```
[line 57: ]
[line 58:      public static final class GeneratorSettings implements Serializable {]
[line 59:          public static final GeneratorSettings empty = new
GeneratorSettings(null, null, null, null);]
```

```
[line 145: ]
[line 146:      public static final class Prefetch implements Serializable {]
[line 147:          public static final Prefetch empty = new Prefetch(null, null,
null);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/CompactStringObjectMap.java':

```
[line 9: ]
[line 10: public final class CompactStringObjectMap implements Serializable {]
[line 11:      private static final CompactStringObjectMap EMPTY = new
CompactStringObjectMap(1, 0, new Object[4]);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/EnumValues.java':

```
[line 14: ]
[line 15: public final class EnumValues implements Serializable {]
[line 16:      private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/ViewMatcher.java':

```
[line 4: ]
[line 5: public class ViewMatcher implements Serializable {]
[line 6:      protected static final ViewMatcher EMPTY = new ViewMatcher();]
```

```
[line 8: ]
[line 9:     private static final class Multi extends ViewMatcher implements
Serializable {]
[line 10:        private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/IgnorePropertiesUtil.java':

```
[line 10: ]
[line 11:     public static final class Checker implements Serializable {]
[line 12:        private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/RootNameLookup.java':

```
[line 8: ]
[line 9: public class RootNameLookup implements Serializable {]
[line 10:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/NameTransformer.java':

```
[line 7: ]
[line 8:     public static class Chained extends NameTransformer implements
Serializable {]
[line 9:         private static final long serialVersionUID = 1;]
```

```
[line 37: ]
[line 38:     protected static final class NopTransformer extends NameTransformer
implements Serializable {]
[line 39:        private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/util/EnumResolver.java':

```
[line 13: ]
[line 14: public class EnumResolver implements Serializable {]
[line 15:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/AnnotatedMethod.java':

```
[line 9: ]
[line 10: public final class AnnotatedMethod extends AnnotatedWithParams implements
Serializable {]
[line 11:     private static final long serialVersionUID = 1;]
```

```
[line 15: ]
[line 16:     private static final class Serialization implements Serializable {]
[line 17:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/introspect/AnnotationIntrospectorPair.java':

```
[line 34: ]
[line 35: public class AnnotationIntrospectorPair extends AnnotationIntrospector
implements Serializable {]
[line 36:      private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/AnnotatedConstructor.java':

```
[line 14: ]
[line 15:     private static final class Serialization implements Serializable {]
[line 16:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/introspect/DefaultAccessorNamingStrategy.java':

```
[line 48: ]
[line 49:     public static class Provider extends
com.fasterxml.jackson.databind.introspect.AccessorNamingStrategy.Provider implements
Serializable {]
[line 50:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/introspect/NopAnnotationIntrospector.java':

```
[line 7: ]
[line 8: public abstract class NopAnnotationIntrospector extends AnnotationIntrospector
implements Serializable {]
[line 9:     public static final NopAnnotationIntrospector instance = new
NopAnnotationIntrospector() {]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/AnnotatedMember.java':

```
[line 8: ]
[line 9: public abstract class AnnotatedMember extends Annotated implements
Serializable {]
[line 10:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/VirtualAnnotatedMember.java':

```
[line 8: ]
[line 9: public class VirtualAnnotatedMember extends AnnotatedMember implements
Serializable {]
[line 10:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/AnnotatedField.java':

```
[line 9: ]
[line 10: public final class AnnotatedField extends AnnotatedMember implements
Serializable {]
[line 11:     private static final long serialVersionUID = 1;]
```

```
[line 14: ]
[line 15:     private static final class Serialization implements Serializable {]
[line 16:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/AccessorNamingStrategy.java':

```
[line 8: ]
[line 9:     public static abstract class Provider implements Serializable {]
[line 10:         private static final long serialVersionUID = 1;]
```

```
[line 18: ]
[line 19:    public static class Base extends AccessorNamingStrategy implements
Serializable {]
[line 20:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/introspect/JacksonAnnotationIntrospector.java':

```
[line 95: ]
[line 96: public class JacksonAnnotationIntrospector extends AnnotationIntrospector
implements Serializable {]
[line 97:     private static final Class<? extends Annotation>[]
ANNOTATIONS_TO_INFER_DESER = new Class[]{JsonDeserialize.class, JsonView.class,
JsonFormat.class, JsonTypeInfo.class, JsonUnwrapped.class, JsonBackReference.class,
JsonManagedReference.class, JsonMerge.class};]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/introspect/BasicClassIntrospector.java':

```
[line 16: ]
[line 17: public class BasicClassIntrospector extends ClassIntrospector implements
Serializable {]
[line 18:     protected static final BasicBeanDescription BOOLEAN_DESC =
BasicBeanDescription.forOtherUse(null, SimpleType.constructUnsafe(Boolean.TYPE),
AnnotatedClassResolver.createPrimordial(Boolean.TYPE));]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/SettableAnyProperty.java':

```
[line 22: ]
[line 23: public class SettableAnyProperty implements Serializable {]
[line 24:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/BeanDeserializer.java':

```
[line 30: ]
[line 31: public class BeanDeserializer extends BeanDeserializerBase implements
Serializable {]
[line 32:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/BasicDeserializerFactory.java':

```
[line 104: ]
[line 105: public abstract class BasicDeserializerFactory extends DeserializerFactory
implements Serializable {]
[line 106:     private static final Class<?> CLASS_CHAR_SEQUENCE = CharSequence.class;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/deser/DefaultDeserializationContext.java':

```
[line 29: ]
[line 30: public abstract class DefaultDeserializationContext extends
DeserializationContext implements Serializable {]
[line 31:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/BeanDeserializerFactory.java':

```
[line 54: ]
[line 55: public class BeanDeserializerFactory extends BasicDeserializerFactory
implements Serializable {]
[line 56:     private static final Class<?>[] INIT_CAUSE_PARAMS = new Class[]
{Throwable.class};]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/SettableBeanProperty.java':

```
[line 27: ]
[line 28: public abstract class SettableBeanProperty extends ConcreteBeanPropertyBase
implements Serializable {]
[line 29:     protected static final JsonDeserializer<Object>
MISSING_VALUE_DESERIALIZER = new FailingDeserializer("No _valueDeserializer
assigned");]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/DeserializerCache.java':

```
[line 27: ]
[line 28: public final class DeserializerCache implements Serializable {]
[line 29:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/ValueInstantiator.java':

```
[line 24: ]
[line 25:     public static class Base extends ValueInstantiator implements
Serializable {]
[line 26:         private static final long serialVersionUID = 1;]
```

```
[line 45: ]
[line 46:     public static class Delegating extends ValueInstantiator implements
Serializable {]
[line 47:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/impl/JDKValueInstantiators.java':

```
[line 19: ]
[line 20:    private static class ArrayListInstantiator extends Base implements
Serializable {]
[line 21:        public static final ArrayListInstantiator INSTANCE = new
ArrayListInstantiator();]
```

```
[line 40: ]
[line 41:    private static class ConstantValueInstantiator extends Base implements
Serializable {]
[line 42:        private static final long serialVersionUID = 2;]
```

```
[line 62: ]
[line 63:    private static class HashMapInstantiator extends Base implements
Serializable {]
[line 64:        public static final HashMapInstantiator INSTANCE = new
HashMapInstantiator();]
```

```
[line 83: ]
[line 84:    private static class LinkedHashMapInstantiator extends Base implements
Serializable {]
[line 85:        public static final LinkedHashMapInstantiator INSTANCE = new
LinkedHashMapInstantiator();]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/impl/ObjectIdReader.java':

```
[line 13: ]
[line 14: public class ObjectIdReader implements Serializable {]
[line 15:    private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/deser/impl/TypeWrappedDeserializer.java':

```
[line 13: ]
[line 14: public final class TypeWrappedDeserializer extends JsonDeserializer<Object>
implements Serializable {]
[line 15:    private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/std/StdKeyDeserializer.java':

```
[line 28: @JacksonStdImpl]
[line 29: public class StdKeyDeserializer extends KeyDeserializer implements
Serializable {]
[line 30:    public static final int TYPE_BOOLEAN = 1;]
```

```
[line 51: ]
[line 52:    static final class DelegatingKD extends KeyDeserializer implements
Serializable {]
[line 53:        private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/std/StdDeserializer.java':

```
[line 45: ]
[line 46: public abstract class StdDeserializer<T> extends JsonDeserializer<T>
implements Serializable, Gettable {]
[line 47:     @Deprecated]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/deser/std/StdValueInstantiator.java':

```
[line 18: @JacksonStdImpl]
[line 19: public class StdValueInstantiator extends ValueInstantiator implements
Serializable {]
[line 20:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/module/SimpleSerializers.java':

```
[line 18: ]
[line 19: public class SimpleSerializers extends Base implements Serializable {]
[line 20:     private static final long serialVersionUID = 3;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/module/SimpleDeserializers.java':

```
[line 23: ]
[line 24: public class SimpleDeserializers extends Base implements Serializable {]
[line 25:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/module/SimpleModule.java':

```
[line 21: ]
[line 22: public class SimpleModule extends Module implements Serializable {]
[line 23:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/module/SimpleAbstractTypeResolver.java':

```
[line 11: ]
[line 12: public class SimpleAbstractTypeResolver extends AbstractTypeResolver
implements Serializable {]
[line 13:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/module/SimpleValueInstantiators.java':

```
[line 10: ]
[line 11: public class SimpleValueInstantiators extends Base implements Serializable {]
[line 12:     private static final long serialVersionUID = -8929386427526115130L;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ext/OptionalHandlerFactory.java':

```
[line 19: ]
[line 20: public class OptionalHandlerFactory implements Serializable {]
[line 21:     private static final Class<?> CLASS_DOM_DOCUMENT;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/DeserializerFactoryConfig.java':

```
[line 12: ]
[line 13: public class DeserializerFactoryConfig implements Serializable {]
[line 14:      protected static final KeyDeserializers[] DEFAULT_KEY_DESERIALIZERS = new
KeyDeserializers[]{new StdKeyDeserializers()};]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/CoercionConfigs.java':

```
[line 11: ]
[line 12: public class CoercionConfigs implements Serializable {]
[line 13:      private static final int TARGET_TYPE_COUNT =
LogicalType.values().length;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/ConstructorDetector.java':

```
[line 5: ]
[line 6: public final class ConstructorDetector implements Serializable {]
[line 7:      public static final ConstructorDetector DEFAULT = new
ConstructorDetector(SingleArgConstructor.HEURISTIC);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/ConfigOverrides.java':

```
[line 12: ]
[line 13: public class ConfigOverrides implements Serializable {]
[line 14:      private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/ContextAttributes.java':

```
[line 9: ]
[line 10:      public static class Impl extends ContextAttributes implements
Serializable {]
[line 11:          protected static final Impl EMPTY = new
Impl(Collections.emptyMap());]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/BaseSettings.java':

```
[line 19: ]
[line 20: public final class BaseSettings implements Serializable {]
[line 21:      private static final TimeZone DEFAULT_TIMEZONE =
DesugarTimeZone.getTimeZone("UTC");]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/MapperConfigBase.java':

```
[line 30: ]
[line 31: public abstract class MapperConfigBase<CFG extends ConfigFeature, T extends
MapperConfigBase<CFG, T>> extends MapperConfig<T> implements Serializable {]
[line 32:      private static final int AUTO_DETECT_MASK =
((((MapperFeature.AUTO_DETECT_FIELDS.getMask() |
MapperFeature.AUTO_DETECT_GETTERS.getMask()) |
MapperFeature.AUTO_DETECT_IS_GETTERS.getMask()) |
MapperFeature.AUTO_DETECT_SETTERS.getMask()) |
MapperFeature.AUTO_DETECT_CREATORS.getMask());]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/CoercionConfig.java':

```
[line 5: ]
[line 6: public class CoercionConfig implements Serializable {]
[line 7:     private static final int INPUT_SHAPE_COUNT =
CoercionInputShape.values().length;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/MutableCoercionConfig.java':

```
[line 4: ]
[line 5: public class MutableCoercionConfig extends CoercionConfig implements
Serializable {]
[line 6:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/MutableConfigOverride.java':

```
[line 9: ]
[line 10: public class MutableConfigOverride extends ConfigOverride implements
Serializable {]
[line 11:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/cfg/SerializerFactoryConfig.java':

```
[line 8: ]
[line 9: public final class SerializerFactoryConfig implements Serializable {]
[line 10:     protected static final BeanSerializerModifier[] NO_MODIFIERS = new
BeanSerializerModifier[0];]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/type/TypeFactory.java':

```
[line 31: ]
[line 32: public class TypeFactory implements Serializable {]
[line 33:     private static final Class<?> CLS_BOOL;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/type/TypeBindings.java':

```
[line 18: ]
[line 19: public class TypeBindings implements Serializable {]
[line 20:     private static final TypeBindings EMPTY;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/type/TypeParser.java':

```
[line 9: ]
[line 10: public class TypeParser implements Serializable {]
[line 11:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/DefaultSerializerProvider.java':

```
[line 32: ]
[line 33: public abstract class DefaultSerializerProvider extends SerializerProvider
implements Serializable {]
[line 34:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/VirtualBeanPropertyWriter.java':

```
[line 17: ]
[line 18: public abstract class VirtualBeanPropertyWriter extends BeanPropertyWriter
implements Serializable {]
[line 19:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/BeanSerializerFactory.java':

```
[line 47: ]
[line 48: public class BeanSerializerFactory extends BasicSerializerFactory implements
Serializable {]
[line 49:     public static final BeanSerializerFactory instance = new
BeanSerializerFactory(null);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/PropertyWriter.java':

```
[line 14: ]
[line 15: public abstract class PropertyWriter extends ConcreteBeanPropertyBase
implements Serializable {]
[line 16:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/BasicSerializerFactory.java':

```
[line 86: ]
[line 87: public abstract class BasicSerializerFactory extends SerializerFactory
implements Serializable {]
[line 88:     protected static final HashMap<String, JsonSerializer<?>> _concrete;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/BeanPropertyWriter.java':

```
[line 43: @JacksonStdImpl]
[line 44: public class BeanPropertyWriter extends PropertyWriter implements
Serializable {]
[line 45:     public static final Object MARKER_FOR_EMPTY = Include.NON_EMPTY;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/ser/impl/UnwrappingBeanPropertyWriter.java':

```
[line 19: ]
[line 20: public class UnwrappingBeanPropertyWriter extends BeanPropertyWriter
implements Serializable {]
[line 21:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/impl/SimpleFilterProvider.java':

```
[line 10: ]
[line 11: public class SimpleFilterProvider extends FilterProvider implements
Serializable {]
[line 12:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/impl/UnwrappingBeanSerializer.java':

```
[line 14: ]
[line 15: public class UnwrappingBeanSerializer extends BeanSerializerBase implements
Serializable {]
[line 16:    private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/impl/SimpleBeanPropertyFilter.java':

```
[line 18: ]
[line 19:    public static class FilterExceptFilter extends SimpleBeanPropertyFilter
implements Serializable {]
[line 20:        private static final long serialVersionUID = 1;]
```

```
[line 37: ]
[line 38:    public static class SerializeExceptFilter extends
SimpleBeanPropertyFilter implements Serializable {]
[line 39:        static final SerializeExceptFilter INCLUDE_ALL = new
SerializeExceptFilter();]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/ser/impl/FilteredBeanPropertyWriter.java':

```
[line 13: ]
[line 14:    private static final class MultiView extends BeanPropertyWriter
implements Serializable {]
[line 15:        private static final long serialVersionUID = 1;]
```

```
[line 71: ]
[line 72:    private static final class SingleView extends BeanPropertyWriter
implements Serializable {]
[line 73:        private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/node/JsonNodeFactory.java':

```
[line 8: ]
[line 9: public class JsonNodeFactory implements Serializable, JsonNodeCreator {]
[line 10:    private static final JsonNodeFactory decimalsAsIs = new
JsonNodeFactory(true);]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/node/NodeSerialization.java':

```
[line 8: ]
[line 9: class NodeSerialization implements Serializable, Externalizable {]
[line 10:    private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/node/ObjectNode.java':

```
[line 25: ]
[line 26: public class ObjectNode extends ContainerNode<ObjectNode> implements
Serializable {]
[line 27:    private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/node/BaseJsonNode.java':

```
[line 14: ]
[line 15: public abstract class BaseJsonNode extends JsonNode implements Serializable
{]
[line 16:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/node/ArrayNode.java':

```
[line 20: ]
[line 21: public class ArrayNode extends ContainerNode<ArrayNode> implements
Serializable {]
[line 22:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/jsontype/PolymorphicTypeValidator.java':

```
[line 7: ]
[line 8: public abstract class PolymorphicTypeValidator implements Serializable {]
[line 9:     private static final long serialVersionUID = 1;]
```

```
[line 16: ]
[line 17:     public static abstract class Base extends PolymorphicTypeValidator
implements Serializable {]
[line 18:         private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/jsontype/DefaultBaseTypeLimitingValidator.java':

```
[line 10: ]
[line 11: public class DefaultBaseTypeLimitingValidator extends
PolymorphicTypeValidator implements Serializable {]
[line 12:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/jsontype/BasicPolymorphicTypeValidator.java':

```
[line 14: ]
[line 15: public class BasicPolymorphicTypeValidator extends Base implements
Serializable {]
[line 16:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/jsontype/NamedType.java':

```
[line 6: ]
[line 7: public final class NamedType implements Serializable {]
[line 8:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/jsontype/impl/AsWrapperTypeDeserializer.java':

```
[line 16: ]
[line 17: public class AsWrapperTypeDeserializer extends TypeDeserializerBase
implements Serializable {]
[line 18:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/jsontype/impl/StdSubtypeResolver.java':

```
[line 23: ]
[line 24: public class StdSubtypeResolver extends SubtypeResolver implements
Serializable {]
[line 25:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/databind/jsontype/impl/TypeDeserializerBase.java':

```
[line 19: ]
[line 20: public abstract class TypeDeserializerBase extends TypeDeserializer
implements Serializable {]
[line 21:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file
'com/fasterxml/jackson/databind/jsontype/impl/AsArrayTypeDeserializer.java':

```
[line 16: ]
[line 17: public class AsArrayTypeDeserializer extends TypeDeserializerBase implements
Serializable {]
[line 18:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/Base64Variant.java':

```
[line 7: ]
[line 8: public final class Base64Variant implements Serializable {]
[line 9:     public static final int BASE64_VALUE_INVALID = -1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/JsonLocation.java':

```
[line 5: ]
[line 6: public class JsonLocation implements Serializable {]
[line 7:     public static final int MAX_CONTENT_SNIPPET = 500;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/util/Separators.java':

```
[line 5: ]
[line 6: public class Separators implements Serializable {]
[line 7:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/util/RequestPayload.java':

```
[line 5: ]
[line 6: public class RequestPayload implements Serializable {]
[line 7:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/io/CharacterEscapes.java':

```
[line 6: ]
[line 7: public abstract class CharacterEscapes implements Serializable {]
[line 8:     public static final int ESCAPE_CUSTOM = -2;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/io/SerializedString.java':

```
[line 10: ]
[line 11: public class SerializedString implements SerializableString, Serializable {]
[line 12:     private static final JsonStringEncoder JSON_ENCODER =
JsonStringEncoder.getInstance();]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/io/InputDecorator.java':

```
[line 8: ]
[line 9: public abstract class InputDecorator implements Serializable {]
[line 10:     private static final long serialVersionUID = 1;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/core/io/OutputDecorator.java':

```
[line 7: ]
[line 8: public abstract class OutputDecorator implements Serializable {]
[line 9:     public abstract OutputStream decorate(IOContext iOContext, OutputStream
outputStream) throws IOException;]
```

There is **'implements Serializable'** found in file 'com/fasterxml/jackson/annotation/ObjectIdGenerator.java':

```
[line 4: ]
[line 5: public abstract class ObjectIdGenerator<T> implements Serializable {]
[line 6: ]
[line 7:     public static final class IdKey implements Serializable {]
[line 8:         private static final long serialVersionUID = 1;]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/common/html/ImprintFragment.java':

```
[line 91:         this.baseUrl = string;]
[line 92:         Serializable serializable = bundle.getSerializable(ARG_BUILD_INFO);]
[line 93:         String str2 = null;]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/transfercode/TransferCodeDetailFragment.java':

```
[line 118:         TransferCodeModel transferCodeModel = null;]
[line 119:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_TRANSFER_CODE);]
[line 120:         if (serializable instanceof TransferCodeModel) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/ratconversion/RatConversionFragment.java':

```
[line 77:         CertificateHolder certificateHolder = null;]
[line 78:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE);]
[line 79:         if (serializable instanceof CertificateHolder) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/pdf/export/PdfExportFragment.java':

```
[line 88:         CertificateHolder certificateHolder = null;]
[line 89:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE_HOLDER);]
[line 90:         if (serializable instanceof CertificateHolder) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/dialog/ModeInfoDialogFragment.java':

```
[line 71:         setStyle(1, R.style.f295CovidCertificate.InfoDialog);]
[line 72:         Serializable serializable =
requireArguments().getSerializable(ARG_MODE_VALIDITIES);]
[line 73:         Objects.requireNonNull(serializable, "null cannot be cast to non-null
type
java.util.ArrayList<ch.admin.bag.covidcertificate.sdk.core.models.state.ModeValidity>{
kotlin.collections.TypeAliasesKt.ArrayList<ch.admin.bag.covidcertificate.sdk.core.model
s.state.ModeValidity> }");]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/dialog/CertificateBannerInfoDialogFragment.java':

```
[line 58:         setStyle(1, R.style.f291CovidCertificate.ChooseModeDialog);]
[line 59:         Serializable serializable =
requireArguments().getSerializable(ARG_EOL_BANNER_INFO);]
[line 60:         Objects.requireNonNull(serializable, "null cannot be cast to non-null
type ch.admin.bag.covidcertificate.common.config.EolBannerInfoModel");]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/dialog/RefreshButtonInfoDialogFragment.java':

```
[line 61:         setStyle(1, R.style.f291CovidCertificate.ChooseModeDialog);]
[line 62:         Serializable serializable =
requireArguments().getSerializable(ARG_REFRESH_BUTTON_INFO);]
[line 63:         Objects.requireNonNull(serializable, "null cannot be cast to non-null
type ch.admin.bag.covidcertificate.common.config.RefreshButtonInfoModel");]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/detail/CertificateDetailFragment.java':

```
[line 159:          CertificateHolder certificateHolder = null;]
[line 160:          Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE);]
[line 161:          if (serializable instanceof CertificateHolder) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/add/CertificateAddFragment.java':

```
[line 85:         CertificateHolder certificateHolder = null;]
[line 86:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE);]
[line 87:         CertificateHolder certificateHolder2 = serializable instanceof
CertificateHolder ? (CertificateHolder) serializable : null;]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/homescreen/pager/CertificatePagerFragment.java':

```
[line 114:              this.qrCodeData = string;]
[line 115:              Serializable serializable =
bundle.getSerializable(ARG_CERTIFICATE);]
[line 116:              this.certificateHolder = serializable instanceof
CertificateHolder ? (CertificateHolder) serializable : null;]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/homescreen/pager/TransferCodePagerFragment.java':

```
[line 132:         TransferCodeModel transferCodeModel = null;]
[line 133:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_TRANSFER_CODE);]
[line 134:         if (serializable instanceof TransferCodeModel) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/light/CertificateLightDetailFragment.java':

```
[line 112:         String str = null;]
[line 113:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE_HOLDER);]
[line 114:         CertificateHolder certificateHolder = serializable instanceof
CertificateHolder ? (CertificateHolder) serializable : null;]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/light/CertificateLightPagerFragment.java':

```
[line 110:              bundle = getArguments();]
[line 111:              Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_CERTIFICATE_HOLDER);]
[line 112:              if (serializable instanceof CertificateHolder) {]
```

There is **'getSerializable()'** found in file
'ch/admin/bag/covidcertificate/wallet/light/CertificateLightConversionFragment.java':

```
[line 90:         CertificateHolder certificateHolder = null;]
[line 91:         Serializable serializable = bundle == null ? null :
bundle.getSerializable(ARG_DCC_HOLDER);]
[line 92:         if (serializable instanceof CertificateHolder) {]
```

There is **'getSerializable()'** found in file 'ch/admin/bag/covidcertificate/wallet/travel/ForeignValidityFragment.java':

```
[line 129:         r1 = "ARG_CERTIFICATE";]
[line 130:         r6 = r6.getSerializable(r1);]
[line 131:     L_0x0012:]
```

Reference:

- https://developer.android.com/reference/android/os/Bundle.html

MISSING ANTI-EMULATION [SAST]   `WARNING`

Description:

The mobile application does not use any anti-emulation or anti-debugger techniques (e.g. detecting rooted devices or checking if contacts are authentic).
This can significantly facilitate application debugging and reverse-engineering processes.

Reference:

- https://github.com/strazzere/anti-emulator

External Communications and Outgoing Traffic

Mobile Application Endpoints

Static mobile application security test revealed the following remote hosts where the mobile application may send or receive data:

Hostname	IP:Port	SSL Encryption	Websec Server Security	Domain Domain Security
javax.xml.xmlconstants:80	Not Resolved:80	Not Tested Yet	Not Tested Yet	Not Tested Yet
www.cc-d.bit.admin.ch:443	Not Resolved:443	Not Tested Yet	Not Tested Yet	Not Tested Yet
www.cc-a.bit.admin.ch:443	Not Resolved:443	Not Tested Yet	Not Tested Yet	Not Tested Yet
www.cc.bit.admin.ch:443	Not Resolved:443	Not Tested Yet	Not Tested Yet	Not Tested Yet
covidcertificate-app.bit.admin.ch:443	Not Resolved:443	Not Tested Yet	Not Tested Yet	Not Tested Yet
tools.ietf.org:443	4.31.198.62:443	`C+`	Not Tested Yet	Not Tested Yet

Software Composition Analysis Test

The mobile application uses the following external and native libraries:

External

- net.i2p
- j$.wrappers

Android Native

- androidx.transition
- androidx.tracing

- j$.util
- j$.time
- j$.lang
- j$.retarget
- ch.ubique
- kotlinx.serialization
- kotlinx.coroutines
- io.jsonwebtoken
- COSE
- com.upokecenter
- com.fasterxml

- androidx.collection
- androidx.exifinterface
- androidx.room
- androidx.core
- androidx.drawerlayout
- androidx.interpolator
- androidx.versionedparcelable
- androidx.security
- androidx.emoji2
- androidx.activity
- androidx.camera
- androidx.viewpager
- androidx.resourceinspection
- androidx.vectordrawable
- androidx.lifecycle
- androidx.legacy
- androidx.documentfile
- androidx.annotation
- androidx.sqlite
- androidx.print
- androidx.localbroadcastmanager
- androidx.inspection
- androidx.cursoradapter
- androidx.dynamicanimation
- androidx.fragment
- androidx.loader
- androidx.recyclerview
- androidx.work
- androidx.arch
- androidx.concurrent
- androidx.appcompat
- androidx.viewpager2
- androidx.customview
- androidx.coordinatorlayout
- androidx.startup
- androidx.savedstate
- androidx.cardview
- androidx.viewbinding
- androidx.constraintlayout
- kotlin
- retrofit2
- android.support