



Integration Specification Documedis CDS.CE

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The target groups of this document are project owners, product managers and software developers interested in adding CDS functionality to their individual software products using Documedis CDS.CE.

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2 Introduction

The target groups of this document are project owners, product managers and software developers interested in integrating Documedis CDS.CE to their individual software products.

The Documedis CDS.CE product is a web-based software that supports professionals from medical practices, hospitals, pharmacies, spitex and homes in checking the medication used or administered by a patient for health risks. This is done with the help of various checks that provide warnings and recommendations about the medication.

Please be aware that this is a SUPPORT system only – the final responsibility for the medication must always remain with the health care professional!

3 Information about the product CDS.CE

3.1 What is CDS.CE?

The Documedis CDS.CE product is a web-based software that supports professionals from medical practices, hospitals, pharmacies, Spitex and homes in checking the medication used or administered by a patient for health risks. This is done with the help of various checks that provide warnings and recommendations about the medication

CDS.CE has the two main functionalities “Med Check” and “Vac Check”:

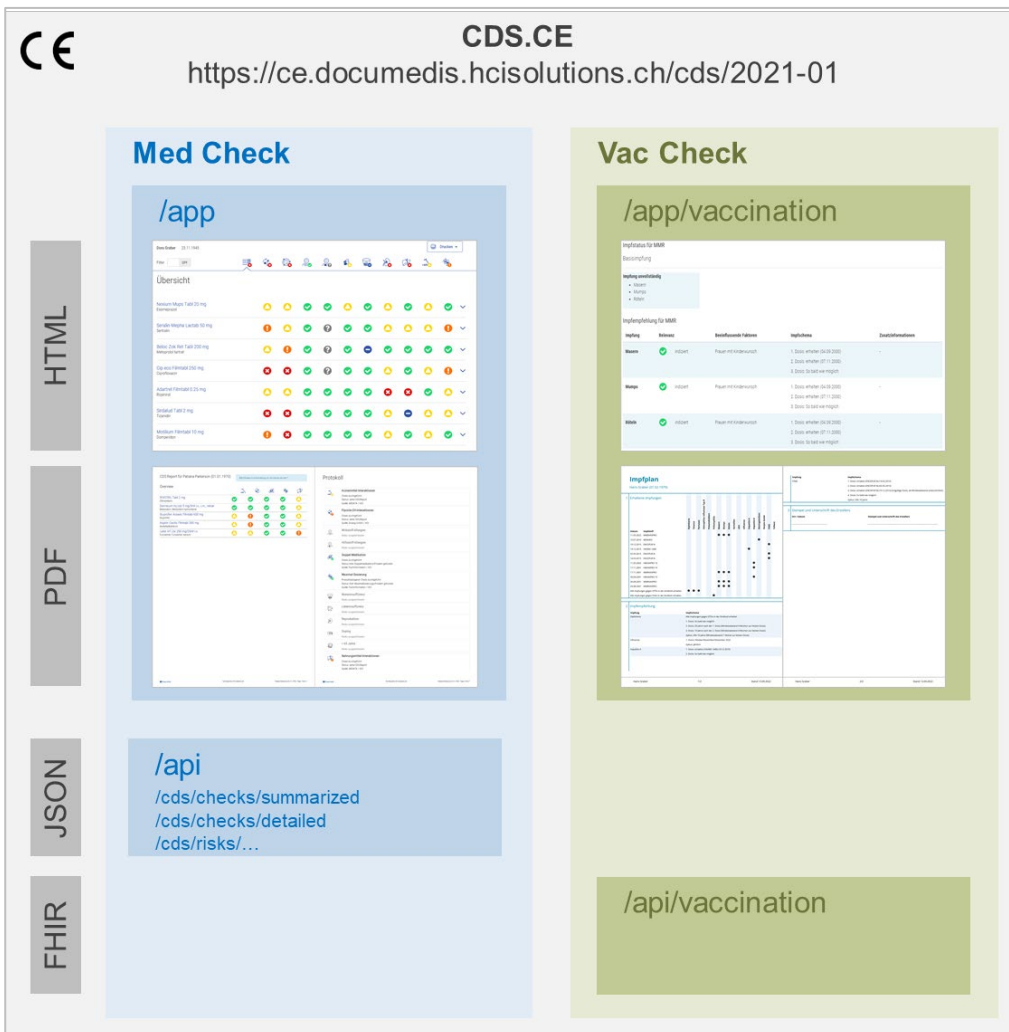


Figure 1 Overview CDS.CE functionalities

	CDS.CE Med Check	CDS.CE Vac Check
APP (UI)	<ul style="list-style-type: none"> • Display the result in HTML format • Display the result in PDF format 	<ul style="list-style-type: none"> • Display the result in HTML format • Display the result in PDF format
API	<p>Based on JSON/REST</p> <ul style="list-style-type: none"> • Do a Med Check and get a summarized result (to display a single icon summary) • Do a Med Check and get a detailed result (to display results for each medication) • Get lists of risks by check type or query keyword (to simplify proper patient risk encoding) 	<p>Based on FHIR</p> <ul style="list-style-type: none"> • Do a Vac Check and get the detailed result for specific check • Do a Vac Check and get the detailed result for generic check

Currently CDS.CE can check the following risks or vaccinations:

Med Checks

- Drug interactions
- Food interactions
- Substance allergy
- Excipient allergy
- Double Medication
- Maximum dosage
- Renal insufficiency
- Liver insufficiency
- Reproduction
- Doping
- Driving ability
- >65 years (elderly people)
- Diabetes
- Flycicle-CH interactions (for hospitals only)

Vac Checks

- Diphtheria
- Tetanus
- Pertussis
- Haemophilus influenzae type b
- Pneumococci
- Poliomyelitis
- Measles
- Mumps
- Rubella
- Varicella
- Human papilloma viruses
- Influenza
- Hepatitis A
- Hepatitis B
- Meningococci
- Herpes Zoster
- TBE
- Rabies

3.2 Intended Purpose

The Documedis CDS.CE product is a web-based software that supports healthcare providers in checking the medication used or planned for a patient for health-relevant risks. This CDS check is based on validated data subject to quality management, e.g. the INDEX databases of HCI Solutions AG.

The product is offered as software-as-a-service (SaaS) via the Internet and is typically integrated by third-party providers as an extension module in their software, which is then used by healthcare end users.

3.3 Residual Risks

When using Documedis CDS.CE, the following residual risks should be considered:

- Medication errors may occur due to use by unqualified users without expert control.
- Technical malfunctions or server failure may result in medication misinterpretation due to a lack of support from Documedis CDS.CE.

3.4 Product Status

- All CDS data is production ready. It already covers most of the relevant medications while our editorial team is hard at work to add the remaining data for the most current medications in the Swiss hospital market.
- The CDS.CE software module is a CE-certified medical device since early 2018.
- A new major release 2021-01 has been released. The original version 2018-01 is still available until the end of 2022 and should be replaced with 2021-01.
- In the end of 2022, the new functionality "Vac Check" was added.

4 General Information about the integration of CDS.CE

4.1 Environments

We provide the following environments:

- Integration environment: <https://int.ce.documedis.hcisolutions.ch/cds/2021-01...>
- Production environment: <https://ce.documedis.hcisolutions.ch/cds/2021-01....>

Please do not use the production environment for testing purposes but only the designated integration environment.

4.2 Requirements – Prerequisites

The following browsers are supported by Documedis CDS.CE:

- Google Chrome (from version 80)
- Microsoft Edge (from version 80)
- Mozilla Firefox (from version 69)
- Safari (from version 11.1)
- embedded Browser (from .NET Framework 4.8)

The minimum screen size for displaying the HTML page must be 1280x400 pixels. A warning is displayed if the window is less than 1280 pixels wide or less than 400 pixels high.



Vorsicht, Ihr Bildschirm ist zu klein für eine optimale Anzeige.

Figure 2 Warning "The screen is too small for optimal display"

4.3 SLA/Availability/Performance

Through the SLA that is part of the INDEX contract giving access to Documedis, we will guarantee an availability of 99.5%. Based on our platform experience, an uptime of 99.9% can be expected, but this is not guaranteed. Service time is 7x24h. Maintenance windows are in the nights from Saturday to Sunday.

To check current CDS.CE module availability, please verify current uptime status using our external monitoring available through <http://stats.pingdom.com/t7myjtazclq9/4192941> (this service tests service availability 1x/minute and is also used for internal alerting and monthly uptime reporting).

Incident response time is 1 hour during office hours (0800h-1700h) on workdays (Monday-Friday), except on public holidays in the Canton of Berne. Response time is the amount of time between your incident report arriving by e-mail (hotline@hcisolutions.ch) or phone (Tel. 058 851 2600) in our Hotline and their acknowledgement.

Incident resolution time is 8 hours during office hours (0800h-1700h) on workdays (Monday-Friday), except on public holidays in the Canton of Berne. Resolution time is the amount of time between your incident report arriving by e-mail (hotline@hcisolutions.ch) or phone (Tel. 058 851 2600) in our Hotline and the resolution of the incident.

Module Performance: Due to the connected nature of the internet, we are unable to guarantee any end-to-end performance values.

4.4 Data Protection and Cybersecurity

The Integrator is responsible to implement state of the art technical and organizational measures.

4.5 Access Control

You can access Documedis CDS.CE with a token which is provided from HCI. If you call Documedis CDS.CE it must either match with the one stored on our backend for the HCI SoftwareOrgId field provided in the request.

5 Integration of CDS.CE Med Check

5.1 Overview

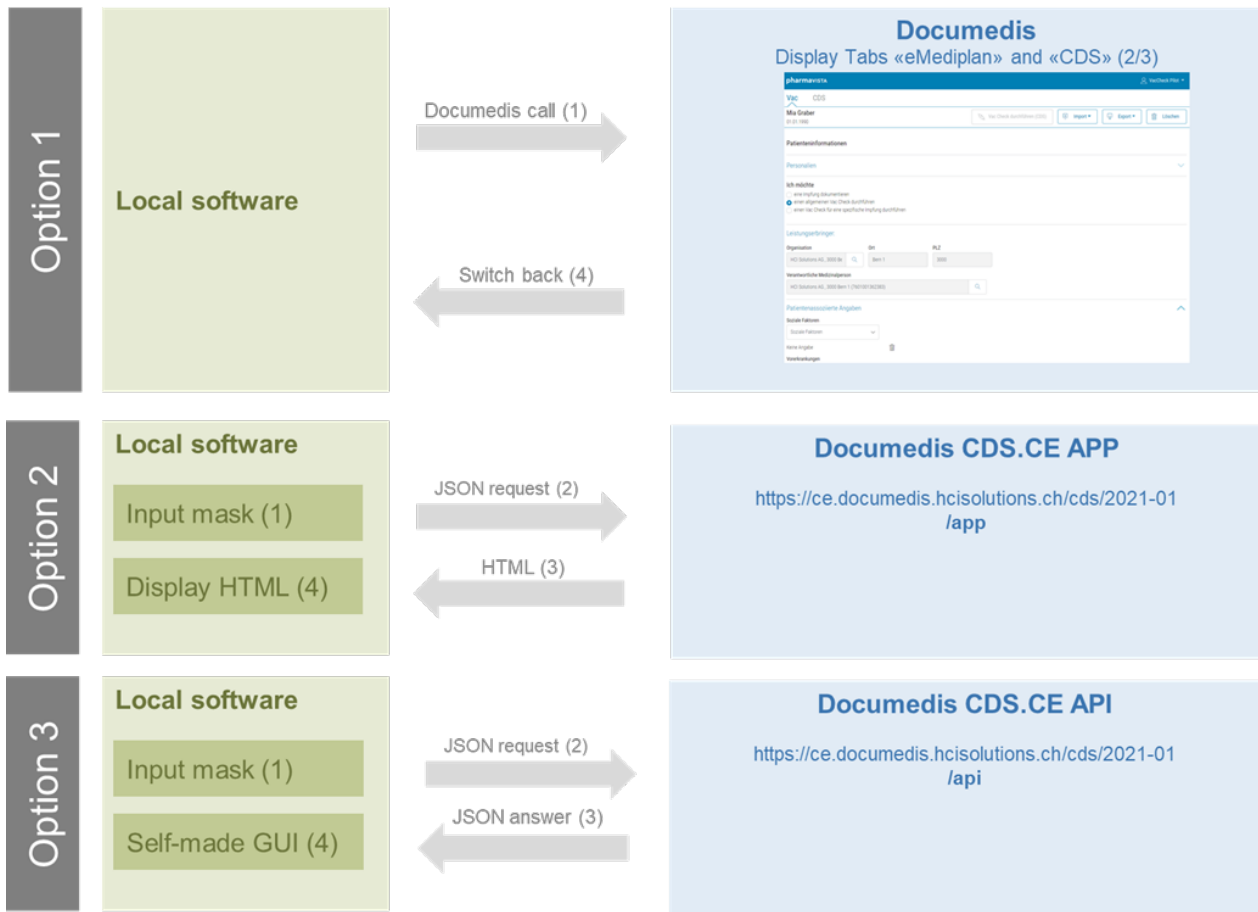


Figure 3 Integration Options CDS.CE Med Check

Option 1	Option 2	Option 3
<ol style="list-style-type: none"> 1. Documedis call with the tabs «eMediplan» and «CDS» 2. Enter the data in Documedis in the tab «eMediplan» 3. Display the results in Documedis in the tab «CDS» 4. If the consultation is finished, switch back to local system 	<ol style="list-style-type: none"> 1. Enter the Data in self-made input mask of local system. 2. Local system sends a request to CDS APP 3. CDS APP sends HTML answer back 4. Display HTML in local system 	<ol style="list-style-type: none"> 1. Enter the Data in self-made input mask of local system 2. Local system sends a request to CDS API 3. CDS API sends structured data back 4. Display structured data in self-made GUI in local system







For option 1 see the document Integration Specification Documedis Medication (<https://www.hcisolutions.ch/de/tecdoc>). The details of the integration of option 2 is described in chapter 5.5 Integration APP (UI) and of option 3 in chapter 5.6 Integration API.






5.2 The CDS Med Check types




In the table below you can find all currently available Med Check types, their icons, and descriptions. Since not every check needs the same input data, you can find the minimal input data in the last column. There are already references to the CHMED object.

Using our check icon in case of an integration is mandatory, due to safety and risk reasons. The icons are available for free to use as SVG, PNG (40x40) and ICO (16/24/32) files through the following link:

https://documedis.hcisolutions.ch/resources/CDS_2021-01.zip

Icon	Check Type	Description	Minimal input data
	allergyExcipient	This check verifies whether a drug excipient matches a patient's documented allergy (or intolerance).	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> The patient's allergies (CHMED RiskCategory 6: Allergies)
	allergySubstance	This check warns if there is a match of a drug substance with a documented allergy of the patient. Cross allergies are also considered.	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> The patient's allergies
	doping	This check verifies whether the drug may be taken before or during a competition. Concretely, it is checked whether a drug from the medication is present on the doping list.	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> Competitive athlete (CHMED RiskCategory 4, risk id 580)
	doubleMedication	This check verifies whether the medication contains a certain active ingredient in more than one systemically acting drug.	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> No patient data needed
	driving	This check verifies whether a drug has an influence on driving ability or on the ability to operate machines.	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> Driver (CHMED RiskCategory 5, risk id 615)
	elderly	This check verifies whether you should exercise caution with a drug if the patient is older than 65 years.	Medication data: <ul style="list-style-type: none"> At least one drug Patient data: <ul style="list-style-type: none"> Date of birth (patient must be older than 65 years)

	interaction	<p>This check checks for the presence of drug-drug interactions.</p>	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> No patient data needed
	interactionFlycycleCH	<p>The Flycycle CH visualizes and evaluates interactions between drugs.</p> <p>The system does not evaluate interactions in theoretical relationships of two, but additionally considers the time and route of administration.</p> <p>Furthermore, it also considers that interactions can be altered in the presence of a third or fourth drug (triplet and quadruplet relationships).</p> <p><i>Only available with hospINDEX, needs a separate subscription option.</i></p>	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug Optional: posology <p>Patient data:</p> <ul style="list-style-type: none"> No patient data needed
	liverInsufficiency	<p>This check verifies whether a drug may be taken, is contraindicated, or whether a dose adjustment should be considered in case of liver insufficiency.</p>	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> Date of birth (patient must be older than 18 years) Liver Insufficiency severity (CHMED RiskCategory 2, risk id's 572, 573 or 574)
	nutrition	<p>This check verifies if there is a food interaction in combination with a drug.</p>	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> No patient data needed
	posology	<p>This check examines whether the maximum dose of a drug has been exceeded.</p>	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug Structured posology of the drugs <p>Patient data:</p> <ul style="list-style-type: none"> Date of birth (patient must be older than 18 years) Weight Size

	renalInsufficiency	This check verifies whether a drug may be taken, is contraindicated, or whether a dose adjustment should be considered in case of renal insufficiency.	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> Date of birth (patient must be older than 18 years) Renal Insufficiency severity (CHMED RiskCategory 1, risk id's 597, 575 or 576, 577)
	reproduction	This check verifies the risks for women of childbearing age and for pregnant and breastfeeding women when taking medicines.	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> Gender (must be a women) Date of birth Reproduction risk (CHMED RiskCategory 3, risk id's 612, 77, 78) If women is pregnant (risk id 78) the date of the last menstruation is also needed
	diabetes	This check verifies whether taking the drug is a risk for diabetics type 1 or 2..	<p>Medication data:</p> <ul style="list-style-type: none"> At least one drug <p>Patient data:</p> <ul style="list-style-type: none"> Date of birth (patient must be older than 18 years) Diabetes risk (CHMED RiskCategory 7, risk id's 779, 780)











5.3 The CDS Med Check relevancies

Each CDS risk for a product is encoded with a **relevance code RLV** and an associated icon. This tells the user how grave the risk is and how he should adapt the treatment (in addition, each risk also features additional detail information).

The **Display Level** defines the display/sort priority to be used if you have to decide which relevance shall be displayed first or in aggregates and is also used in the "hideAbove" variable of the API calls. Please be aware, that you cannot set a general display level lower than 400 and for liver and renal insufficiency checks this value cannot be under 510.

Using our icons for showing the relevance is mandatory, due to safety and risk reasons. The icons are available for free to use as SVG, PNG (40x40) and ICO (16/24/32) files through the following link:
https://documedis.hcisolutions.ch/resources/CDS_2021-01.zip

On the following page you can find all the icons and their descriptions, RLV Codes and Display Levels.

	Icon	Description The exact description depends on the risk types involved.	RLV Code	Display Level
Not filterable	Technical problem			
		Service not available. Due to technical reasons, this check is not available.	500	0
	High risks			
		Stop! Contraindication! One or more of the data sources explicitly mention <i>an absolute contraindication of the product for this risk type!</i>	1	100
		Caution! Major risk! One or more of the data sources explicitly mention <i>a relative contraindication of the product for this risk type.</i>	2	200
	Potential risks			
		Stop! Not enough input! The data sources for this product <i>contain a relevant check, but the patient data is incomplete due to missing risk parameters.</i> Please complete your patient data.	-1	300
	Caution! No data available! The data sources of this product were <i>not yet researched for this risk,</i> therefore no automatic check is possible.	0	400	
filterable	Medium and low risks			
		Caution: Known risk. One or more of the data sources explicitly mention <i>a light relative contraindication of the product for this risk type.</i>	3 4 5	500 510 520
		No information. The data sources explicitly contain <i>no information about this risk type for the product.</i>	6	600
		Conflicting scientific results. The data sources contain conflicting information about this risk type of the product (only for check "interactionFlycycleCH")	70	700
	No risks			
		No Risk known. None of the data sources used by the medical editors at HCI mention any kind of risk <i>of this type.</i>	99	800
	Nothing to display	Not applicable (n/a). This product is not relevant for this CDS check.	100	1000
	Nothing to display	Above threshold. The check resulted in a risk above the desired display priority.	null	Null
Other Icons				
	Not transmitted products This icon can be used in your software for labelling the products that have not been transmitted to the CDS check.	-	-	

5.4 Request in general

The following headers must be sent for any request to CDS Check:

Key	Type
Authorization* (When used as Header field) access_token (When used as Form parameter)	Bearer token, e.g. "Bearer yourBase64TokenReceivedFromHCI"
Accept-Language	Content language (string, de-CH / fr-CH). All data is available in German or French only. If no such header is provided, the API defaults to German content. For French, put "fr-CH". When calling the APP, this can also be part of the URL route.
HCI-CustomerId*	** The GLN of the software's end-user
HCI-Index*	**The INDEX variant that shall be used by the service (e.g. "hospINDEX"). Casing is irrelevant. Used by HCI to verify with internal subscriber data (check if CustomerId has matching INDEX subscription)
HCI-SoftwareOrgId*	**The PartnerId of the software company responsible for this software. Must have INDEX contract. The number part of your EPNxxxxxx@hcisolutions.ch account. Might be verified by HCI with subscriber data to check if the software company indeed has the necessary access level.
HCI-SoftwareOrg*	**The Description of the software provider responsible for this software, must have an INDEX software provider subscription. The manufacturer of the application (e.g. "YourCompany GmbH") [base64]
HCI-Software*	**The name of the application instance / installation that is calling the HCI services (e.g. "KIS Unispital Bern" or "Medfolio KSSG"). Needed to identify the system in case of usage problems. Name must be known by IT-responsible of the installation operator as identified in HCI-CustomerID.** [base64]. Good practice would be to use the same string as the one stored in the token description.
HCI-UserId	**The validated GLN of the HealthCareProfessional or the validated (!) Swiss-Rx-Login of the user of your system or the internal identifier of the user in the system described in the HCI-Software field. For personalized functions (e.g. 7601001234567 or maxmiller@insel.ch or mm63) [base64]
HCI-UserName	**Display name of the user (e.g. "Max Miller") [base64]

* Indicates that the header is **mandatory** and must not be empty.

The header field values must use ASCII encoding according to the standard. Exempt are the few custom "HCI-*" fields that optionally also accept [base64] encoding; these must use UTF-16 (Windows/.NET default).

Use the base64 encoding if your values can contain characters outside the ASCII range, such as umlauts. In such a case, provide the base64-string inside square brackets (ASCII 91 for "[" and ASCII 93 for "]") as value.

5.5 Integration APP (UI)

Integration of the CDS application allows to obtain a visualization of the CDS check. This visualization exists in 2 formats: Single Page Application (SPA/HTML) or PDF. The 'Accept' header specifies the desired variant.

5.5.1 Request Structure

Headers

Key	Values	Content
Accept	text/html or application/pdf	The format of the CDS check response, HTML or PDF
HCI-Stylecolor1 HCI-Stylecolor2	e.g. "ff0000" for red	Hex RGB values to set the primary and secondary custom colors, without #. Color1 defines the color of H1/H2/HR, Color2 of some secondary elements.

Payload

	Type	Values	Content
medication*	string	CHMED16A...	CHMED-string of the patient medication
checks	List	Configuration of checks	Default / if empty or missing: all risks / all levels
check*	string	e.g. interaction	Check Type, see table on 5.2
hideAbove*	int	e.g. 400	The highest risk display level to display (see 5.3). Use this to minimize overalerting. If the value is set, the check returns a relevance "rlv" result of null/empty for the selected check type; it will therefore hide all risks lower than the threshold defined by this value. Allowed values: >= 400, not permitted to be lower. >= 500 for liver and renal insufficiencies. Default / if empty or missing: all levels
targetOrigin	string	"*" for desktop applications "yoursite.com" for iframe integration in web applications	Value used by the CDS viewer to decide on how to transmit back the current height of the HTML view to the parent window using JavaScript: "*": js window.external.documedisCdsCeHeightChanged "yoursite.com": js postMessage
printModes	list	check, product	If one or both of the allowed values are included in the request, the HTML UI will show a "Print"-Button that allows the printout of the CDS result in different layouts (see chapter 6.5.3 response)
helpUrl	string	"default" "https://acme.com/cdshelp"	If a helpUrl value is provided, a help button is displayed in the top right corner of the app. With a value of "default", this button will point to the generic online documentation of the Documedis CDS. To link to your own docs instead, just provide the desired URL as the helpUrl value. If empty the "help" button is not shown.

* Indicates that the header is **mandatory** and must not be empty.

It is possible to choose the tab of the cds check which is selected by default, for that it is enough to add the name of the check at the end of the url.

Building the URL to the CDS application:

Template: {baseAppUrl}/{culture}/{check|printMode}

- baseAppUrl : e.g. for integration <https://int.ce.documedis.hcisolutions.ch/cds/2021-01/app>
- culture (optional) : 'fr-CH' or 'de-CH'. If not specified, CDS will take the default language specified in browser. You can alternatively define it in the 'Accept-Language' header.
- check|printMode (optional):
 - SPA / HTML : the Check Type, must be one defined in the check list of the payload
 - PDF :
 - 'check' : if you want the pdf document grouped by check
 - 'product' : if you want the document grouped by medicament

Here are some examples with the integration environment:

- You want to call the interactions directly: <https://int.ce.documedis.hcisolutions.ch/cds/2021-01/app/interaction>
- You want to get the PDF grouped by product: <https://int.ce.documedis.hcisolutions.ch/cds/2021-01/app/product>
- You want to display the check in French: <https://int.ce.documedis.hcisolutions.ch/cds/2021-01/app/fr-CH>

5.5.2 Request Example

```

{
  "medication":
  "CHMED16A1H4sIAAAAAAAC72VTY/aMBCG/8rK10I3NvmA3EojtqiWjQjdQysOIZklUYIdOU4livLfdxwD3dMiKELCYvJ6PH7mVWLvS
  RirHLgi/p5MnuMtEJ8EQsakR2aHxycZr0GiMA4wjdCR7fQp7bMBSk/AU5zzWY9ESgLoBJR/5ZUJvuZqZ6IZ32CQAoZhJrgujOEcUr1z
  MKvVHLjRQg1b4ls9skiI/3tPpphitZ0TOCij61JndZSYkRzPPkn0II28kzQ4Bu4xna7alSaI626b5a6CbuVLXCLISL3k+fYEdNLzTQ
  7TlPXOc3TdtW2XS95gpZxZQrzcjIptTGzG1qCtjYnzDzgZpIgzOSZtFh32L4w8RALYXxYcoXUhdGBJhvfzb6FI f+x9Gxm+1JtPyO6c
  tis6ilhZFI1xI4Rz+xVRGjFP7QIVRdtahZm7LP6zBOCs1/sIZQiw3drRP/5n3HeoY3gEpCXefict6BPdWfWnHZaMykWSpbJLi8RvIv
  1e4PBwOb4pNz2JP+SsU6hqPqUVtj3r3dTmMZzHzWvCHxwesoEp8QUrYXA5vj9yboL/D1m5/gD5v6gLKPyDrKua8wWPvcsdvBK39Po6P
  /X5BXCWq1ytXHXbT9+M8r/7uZLZT2bapLwemzPPcOxNH15/KWCuc5FCmmkw/REkGW73S3JynG6vrCrUveDSZqLup/3WwtJhPqc8GnzC
  w9NGz2OIWOHovs3F3RbdvfmCmRgwIAAA=",
  "checks": [
    {
      "check": "AllergyExcipient",
      "hideAbove": 400
    },
    {
      "check": "AllergySubstance",
      "hideAbove": 400
    },
    {
      "check": "interaction",
      "hideAbove": 400
    },
    {
      "check": "nutrition",
      "hideAbove": 400
    },
    {
      "check": "elderly",
      "hideAbove": 400
    },
    {
      "check": "reproduction"
    }
  ],
  "targetOrigin" : "http://localhost/",
  "printModes" : [
    "check",
    "product"
  ],
  "helpUrl" : "Default"
}

```


5.5.3 Response

The answer is simply a full working html page which can be displayed in a browser or a pdf file depending on the value of the 'Accept' header.

Mia Graber 02.04.1991

Hilfe

Drucken ▾

Filter ON

☰
🔄
💊
🗑️
👤
🚲

Übersicht

Ventolin Dosieraeros 100 mcg <small>Salbutamol</small>	✔️	⚠️	❌	⌵
Dafalgan Filmtabl 1 g <small>Paracetamol</small>	✔️	⚠️	❌	⌵
Demogripal C Gran <small>Ascorbinsäure (Vitamin C, E300), Paracetamol</small>	✔️	⚠️	❓	⌵
Vi-De 3 Tropfen 4500 IE/ml <small>Cholecalciferol (Vitamin D3)</small>	✔️			⌵
Roaccutan Kaps 20 mg <small>Isotretinoin</small>	✔️		❌	⌵

Protokoll

Arzneimittel-Interaktionen

Check durchgeführt
 Status: Keine Interaktion in der INDEX-Datenbank hinterlegt. Bitte Fachinformation beachten.
 Quelle: Fachinformation / Literatur

Wirkstoff-Allergien

Check durchgeführt
 Status: Keine Wirkstoff-Allergie gefunden
 Quelle: Fachinformation / ABDATA

Hilfsstoff-Allergien

Check durchgeführt
 Status: Keine Hilfsstoff-Allergie gefunden
 Quelle: Fachinformation / ABDATA

Figure 4 Example html page

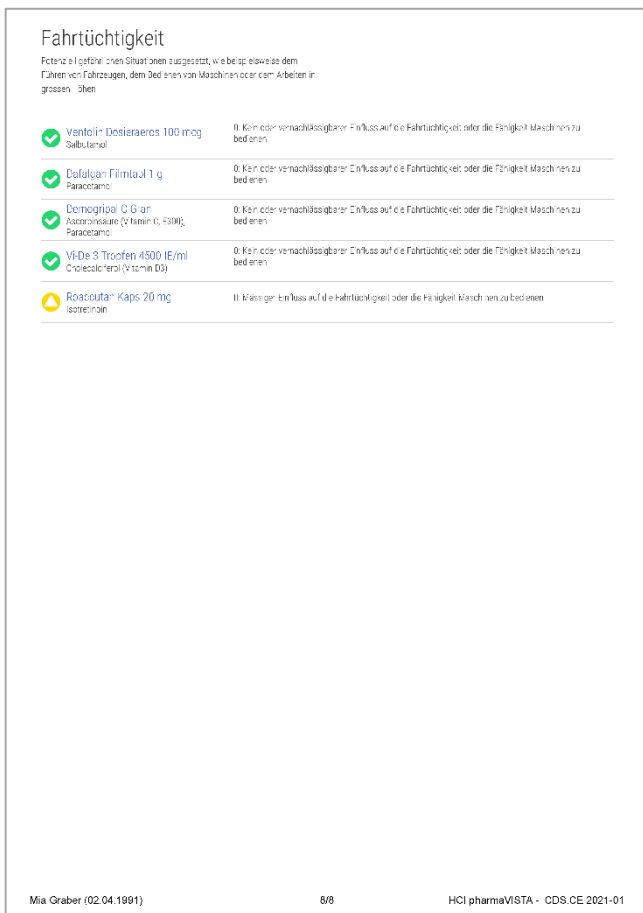


Figure 5 Example pdf "check"

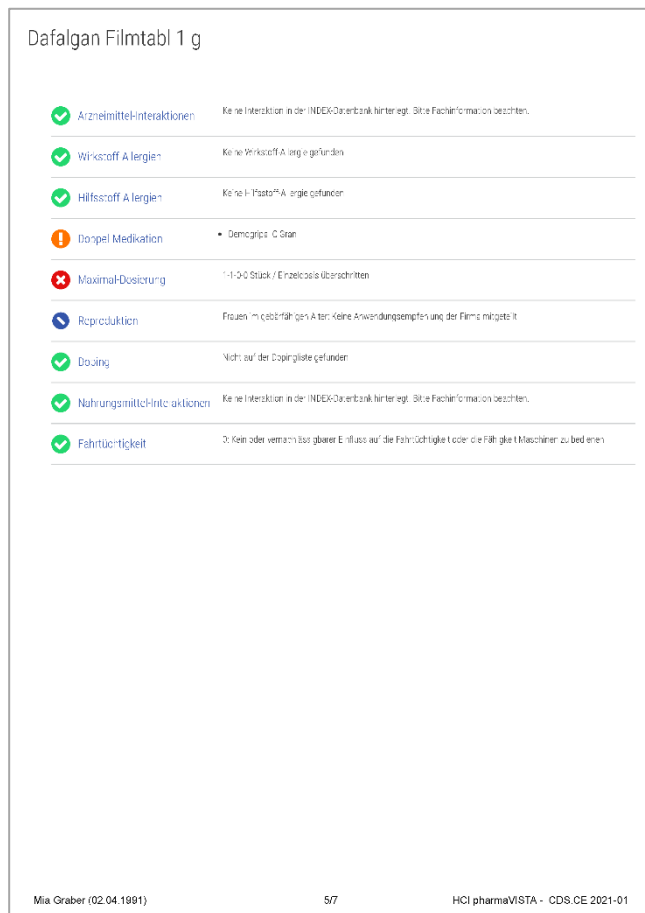


Figure 6 Example pdf "medicament"

5.6 Integration API

The API offers two levels of detail for the CDS check.

- Summarized: The CDS response in this case is rather compact, it is typically used for the implementation of a "Traffic light system". This check could be used to display a single icon as a check result summary, perhaps with some additional tooltip information.
- Detailed: The response contains all details of the CDS check. This response can be used to build a graphical interface with the detailed check information. It is this route that our application uses to build the PDF or SPA.

Both methods use the same algorithm, only the resulting JSON response is different. We strongly suggested to only use the summarized check, then take that response to display the CDS check result in general and to proceed to the APP to display the check result detail. This way, you can take full advantage of the CDS.CE module of Documedis. You may choose to implement your own GUI using the detailed check.

The choice of the variant is made by the URL of the endpoint

- Summarized: {baseApiUrl}/checks/summarized
- Detailed: {baseApiUrl}/checks/detailed

5.6.1 Request Structure

Headers

Key	Values	Content
Accept	application/json	The only format supported by the API

Payload

	Type	Values	Content
medication*	string	CHMED16A...	CHMED-string of the patient medication
checks	List	Configuration of checks	Default / if empty or missing: all risks / all levels
check*	string	e.g. interaction	Check Type, see table on 5.2
hideAbove*	int	e.g. 400	The highest risk display level to display (see 5.3). Use this to minimize overalerting. If the value is set, the check returns a relevance "rlv" result of null/empty for the selected check type; it will therefore hide all risks lower than the threshold defined by this value. Allowed values: >= 400, not permitted to be lower. >= 500 for liver and renal insufficiencies. Default / if empty or missing: all levels

* Indicates that the header is **mandatory** and must not be empty.

Please note that the construction of the body is identical to that of the app (5.5.1). The second part is strictly reserved for display, it is not necessary for the call to the API.

5.6.2 Request Example

```

{
  "medication":
  "CHMED16A1H4sIAAAAAAAC72VTY/aMBCG/8rK10I3NvmA3EojtqiWjQjdQysOIZklUYIdOU4livLfdxwD3dMiKELCYvJ6PH7mVWLvS
  RirHLgi/p5MnuMtEJ8EQsakR2aHxycZr0GiMA4wjdCR7fQp7bMBSk/AU5zzWY9ESgLoBJR/5ZUJvuZqZ6IZ32CQAoZhJrgujOEcUr1z
  MKvVHLjRQg1b4ls9skiI/3tPpphitZ0TOCij6lJndZSYkRzPPkn0II28kzQ4Bu4xna7alSaI626b5a6CbuVLXCLISL3k+fYEdNLzTQ
  7TlPXOc3TdtW2XS95gpZxZQrzcjIptTGzG1qCtjYnzDzgZpIgzOSZtFh32L4w8RALYXxYcoXUhdGBJhvfzbZ6FI f+x9Gxm+1JtPyO6c
  tis6ilhZFI1xI4Rz+xVRGjFP7QIVRdtahZm7LP6zBOCs1/sIZQiw3drRP/5n3HeoY3gEpCXefict6BPdWfWnHZaMykWSpbJLi8RvIv
  le4PBwOb4pNz2JP+SsU6hqPqUVtj3r3dTmMZHZWvCHxwesoEp8QUrYXA5vj9yboL/D1m5/gD5v6gLKPyDrKua8wWPvcsdvBK39Po6P
  /X5BXCWq1ytXHXbT9+M8r/7uZLZT2bapLwemzPPcOxNH15/KWCuc5FCmmkw/REkGW73S3JynG6vrCrUveDSZqLup/3WwtJhPqc8GnzC
  w9NGz2OIWOHovs3F3RbdvfmCmRgwIAAA=",
  "checks": [
    {
      "check": "AllergyExcipient",
      "hideAbove": 400
    },
    {
      "check": "AllergySubstance",
      "hideAbove": 400
    },
    {
      "check": "interaction",
      "hideAbove": 400
    },
    {
      "check": "nutrition",
      "hideAbove": 400
    },
    {
      "check": "elderly",
      "hideAbove": 400
    },
    {
      "check": "reproduction"
    }
  ]
}

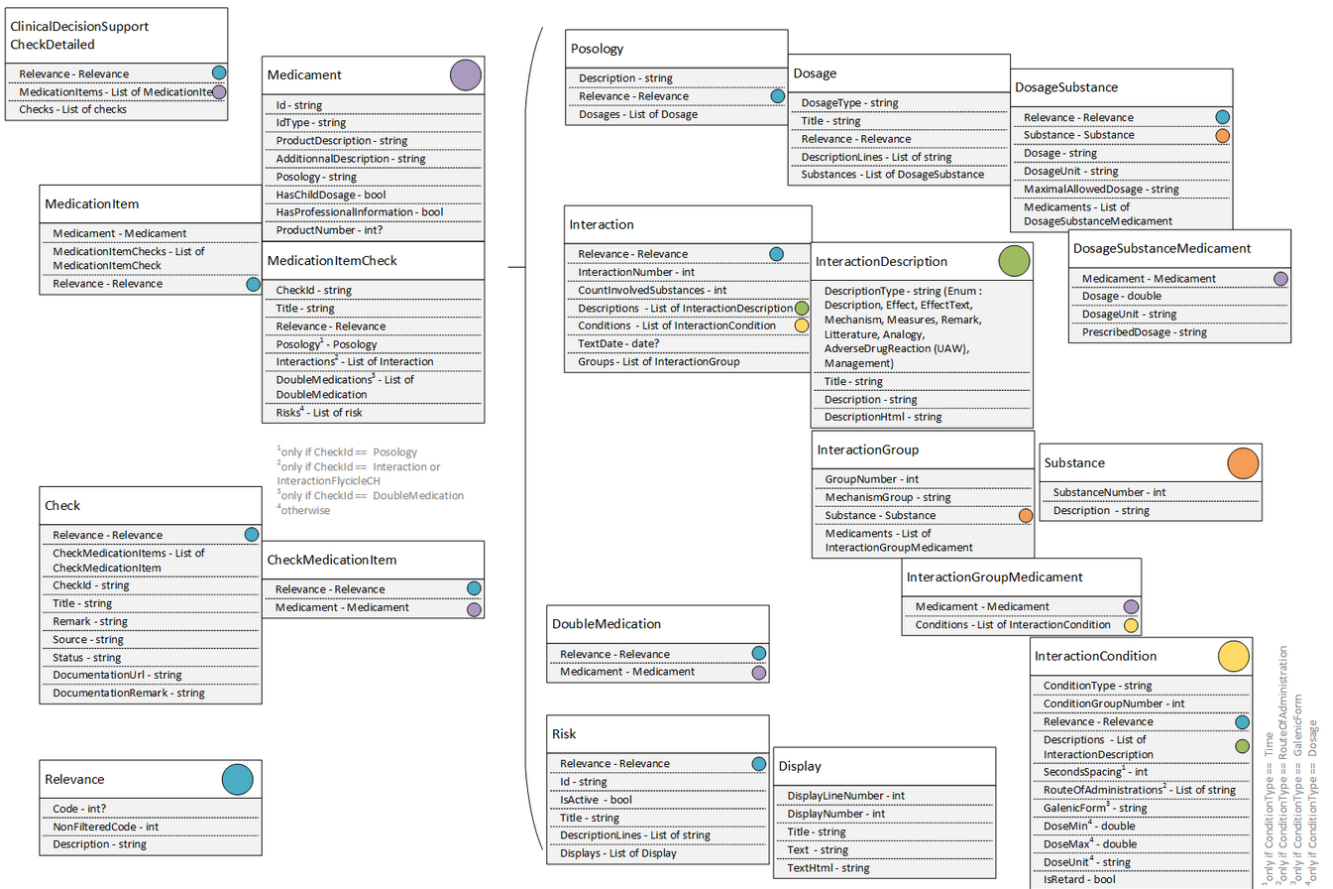
```

5.6.3 Response Structure

The result of the detailed CDS check is a complex JSON object that allows you to build a GUI similar to the one offered by the APP. To get a fully documented view of the object with all its properties, use the swagger-based documentation available through {baseApiUrl}/docs.

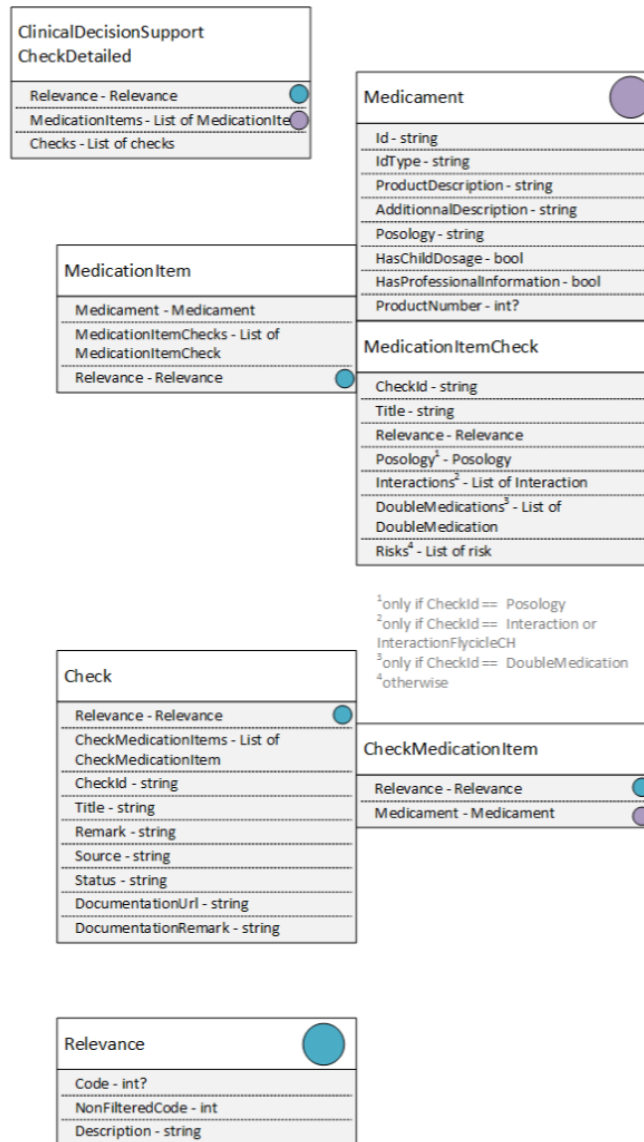
The following diagram describes the result object in a graphical way which might make it easier to understand. It must be read from the leftmost corner, top to bottom, going right to drill down deeper into the object tree. Large colored points mark a class type that is repeatedly used in different parts of the response; these are the *Relevance* ■, the *Medicament* ■ and the *Substance* ■ objects.

On the following pages the diagram will be explained using a left and a right half of it, split between the main objects and the *MedicationItemCheck* details as denoted by the large left brace in the middle of the diagram.



Basically, the *ClinicalDecisionSupportCheckDetailed* result has three main properties:

- The summarized *relevance* ■ of the *check*, as described in “5.3 The CDS Med Check relevancies”.
- A result perspective based on each *MedicationItem* of the patient. A list of medications and their risks.
- A result perspective based on each *Check type*. A list of check and their risks.



Going into the details of the left part of the diagram:

Each *MedicationItem* consists of :

- The Relevance [] of this MedicationItem;
- The Medicament [] used in this MedicationItem. The id and description of the drug product itself;
- The various MedicationItemChecks that were performed for this MedicationItem. This is a list of all the checks that were done for this item based on the data available for this product and the risks of the patient.
 The availability of some of these properties depends on the type of the check: The Posology object is only available for this check, and the same goes for Interactions and DoubleMedications. In all other cases, the details are in the generic list of risks. Details about these specific properties can be found on the next page.

Each *Check* consists of:

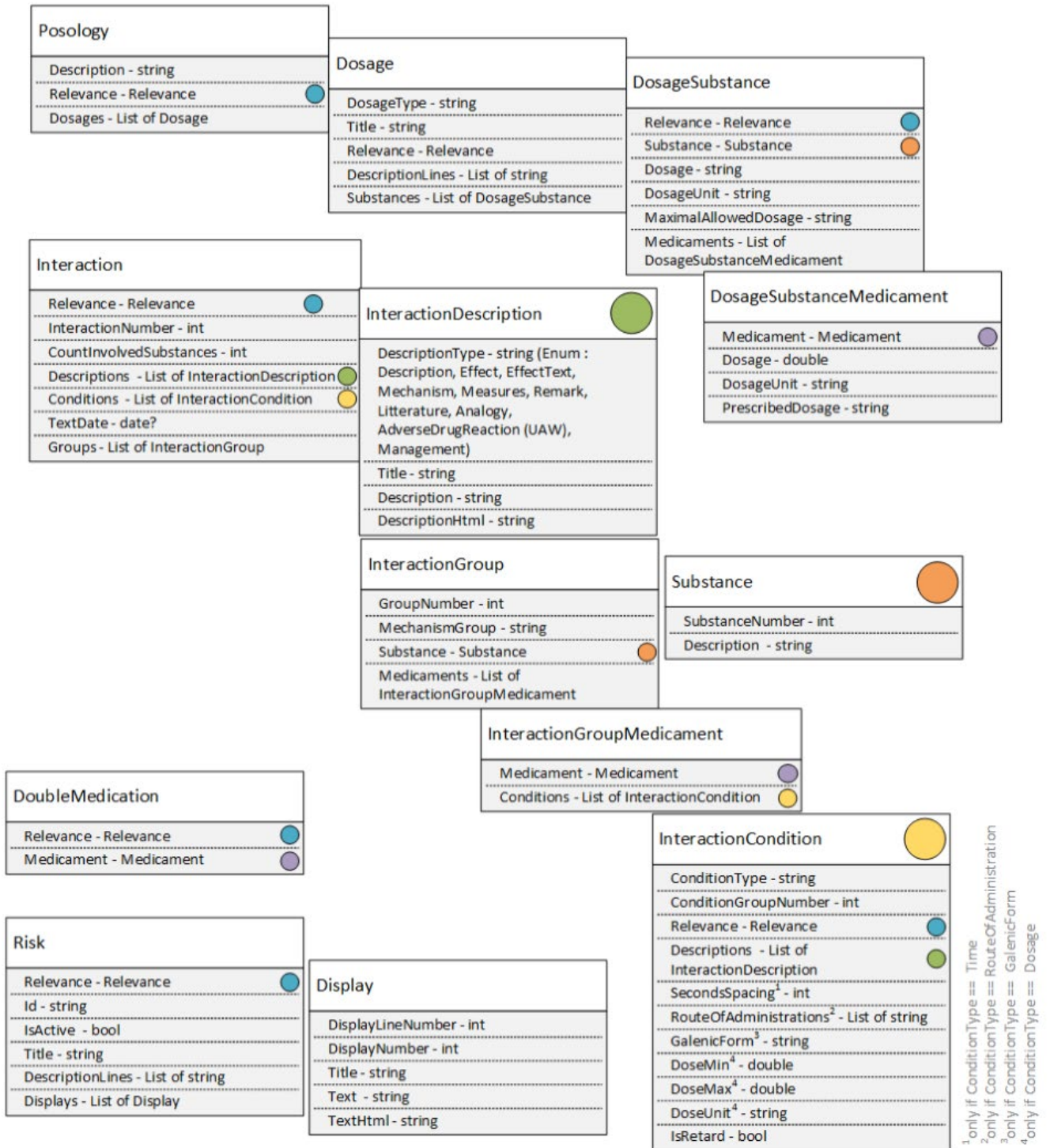
- The Relevance [] of this Check;
- The various CheckMedicationItems used in this Check. This is a list of all Medicaments and their Relevance relevant to this Check;

- Various details about the Check.

The *Relevance* consists of :

- a result code based on the hideAbove filter provided;
- a nonfiltered “true” result code and
- the description of the Relevance in the language of the Accept-Language header field of the request.

The *Relevance* object is also re-used in many of the check details [1].




Going into the details of the right part of the diagram:

As described above, each *MedicationItemCheck* can have slightly different properties, depending on the exact type of the check itself.

For the *Posology* check result:

- The Posology with a list of all Dosages checked
 - With a list of the relevant individual *DosageSubstances*
 - As defined by the *Substance* according to a list of all *DosageSubstanceMedicaments*
 - which consists of each *Medicament* and its dosage.

For the *Interaction* check results:

- A list of all Interactions, with the details for each:
 - The causing and the reacting substance mechanisms as a lists of *InteractionGroups*, the list of interaction descriptions and the list of conditions
 - For each *InteractionGroup*, the *Substance*  and the list of *InteractionGroupMedicaments* with that substance
 - For each *Substance*, its id and description.
 - For each *InteractionGroupMedicaments*, its medicament and the list of condition in which the interaction is relevant
 - For each interaction description, the type of description and the attributes of this description (title, description, descriptionHtml (same as description but with html formatting tags))

For a *DoubleMedication* check result:

- A list of all DoubleMedications, with the details of each:
 - The *Relevance* for each *Medicament* with that risk.

For any other type of *Risk* check result:

- A list of all Risks, with the details of each.

5.7 Error Handling

The following errors could be returned by the CDS Service:

Error	Description
Unauthorized (401)	Your request has been rejected because you are not authorized to used the service. Please check your token and HCI Headers (please refer to 4.5 and 5.4).
Forbidden (403)	You are authenticated but not authorized, please contact the hotline
Unprocessable entity (422)	You request is not valid because of structure of the body or semantic errors. Please pay attention of the description contained in the response body, you should find the error.
Internal Server error (500)	Something does is wrong on our side, please try again and contact us if the problem persists.

5.8 Acceptance Criteria for verification of installation

- To ensure, that the warning messages in the primary system are understandable, our icons must be used in an API integration and must be at least 16 pixels in size.
- The checks interaction and doubleMedication may only be activated together
- The checks allergyExcipient and allergySubstance may only be activated together

Furthermore, an acceptance test must be carried out at the end of the integration and before going live.

6 Integration of CDS.CE Vac Check

6.1 Overview

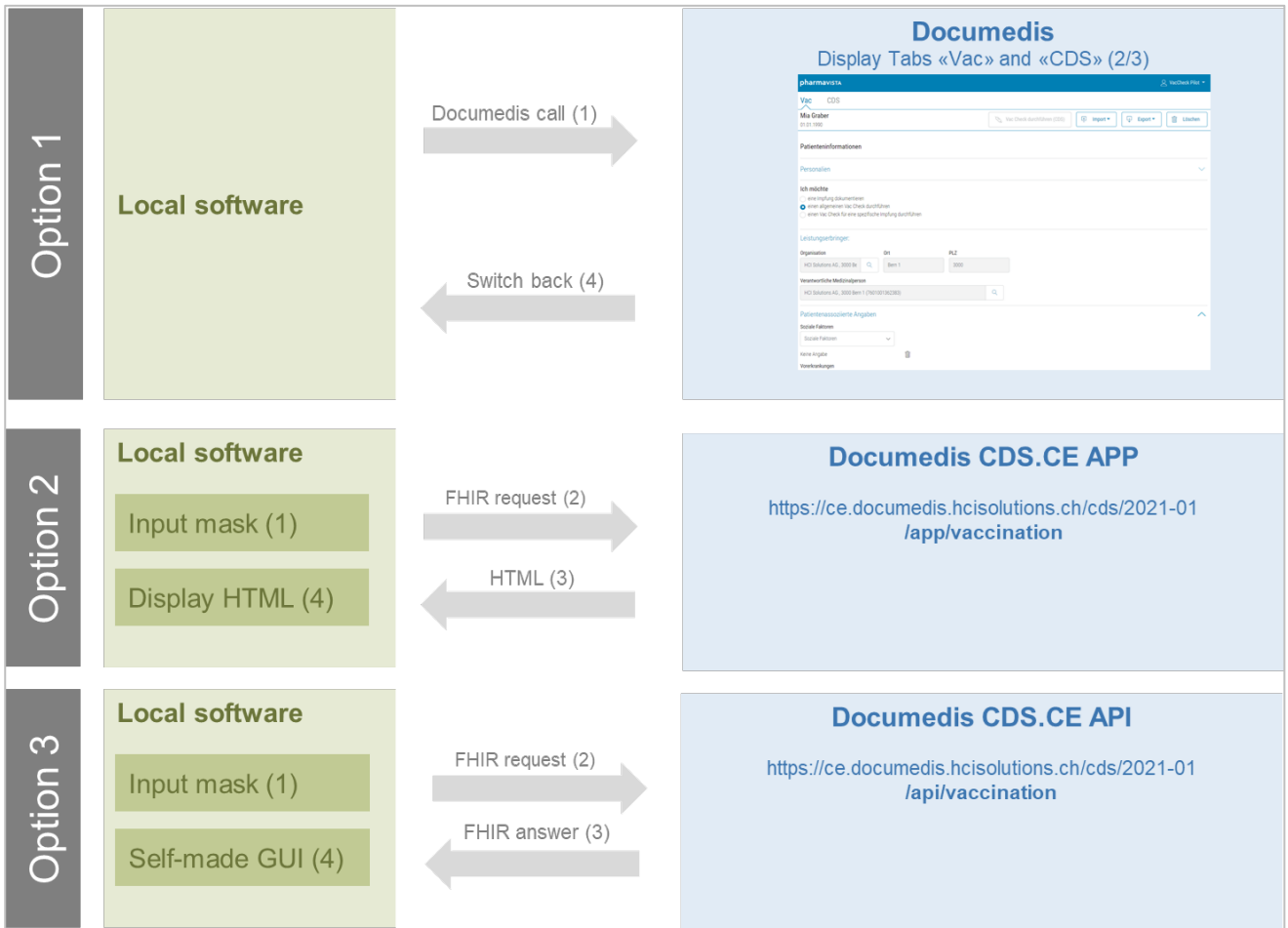


Figure 7 Integration options CDS.CE Vac Check

Option 1	Option 2	Option 3
<ol style="list-style-type: none"> 1. Documedis call with the tabs «Vac» and «CDS» 2. Enter the data in Documedis in the tab «Vac» 3. Display the results in Documedis in the tab «CDS» 4. If the consultation is finished, switch back to local system 	<ol style="list-style-type: none"> 1. Enter the Data in self-made input mask of local system. 2. Local system sends a FHIR request to CDS APP 3. CDS APP sends HTML answer back 4. Display HTML in local system 	<ol style="list-style-type: none"> 1. Enter the Data in self-made input mask of local system 2. Local system sends a FHIR request to CDS API 3. CDS API sends structured data back 4. Display structured data in self-made GUI in local system

For option 1 see the document Integration Specification Documedis Medication (<https://www.hcisolutions.ch/de/tecdoc>). The details of the integration of option 2 is described in chapter 0 The bundle must follow the requirements according to the profile CH VACD Message Immunization Recommendation Request : <https://fhir.ch/ig/ch-vacd/StructureDefinition-ch-vacd-recommendation-request-message.html>.

Additionally, the following headers must be sent for any request to CDS Check.

Key	Type
Authorization* (When used as Header field) access_token (When used as Form parameter)	Bearer token, e.g. "Bearer yourBase64TokenReceivedFromHCI"
Accept-Language	Content language (string, de-CH / fr-CH). All data is available in German or French only. If no such header is provided, the API defaults to German content. For French, put "fr-CH". When calling the APP, this can also be part of the URL route
HCI-CustomerId*	**The identifier of the INDEX subscriber using this software instance. If the end user has an INDEX login, this is the numeric part of his INDEX username. If the end user does not have an INDEX login, but only has a subscription, this is the GLN
HCI-Index*	**The INDEX variant that shall be used by the service (e.g. "hospINDEX"). Casing is irrelevant. Used by HCI to verify with internal subscriber data (check if CustomerId has matching INDEX subscription)
HCI-SoftwareOrgId*	**The PartnerId of the software company responsible for this software. Must have INDEX contract. The number part of your EPNxxxxxx@hcsolutions.ch account. Might be verified by HCI with subscriber data to check if the software company indeed has the necessary access level.
HCI-SoftwareOrg*	**The Description of the software provider responsible for this software, must have an INDEX software provider subscription. The manufacturer of the application (e.g. "YourCompany GmbH") [base64]
HCI-Software*	**The name of the application instance / installation that is calling the HCI services (e.g. "KIS Unispital Bern" or "Medfolio KSSG"). Needed to identify the system in case of usage problems. Name must be known by IT-responsible of the installation operator as identified in HCI-CustomerID.** [base64]. Good practice would be to use the same string as the one stored in the token description.
HCI-UserId	**The validated GLN of the HealthCareProfessional or the validated (!) Swiss-Rx-Login of the user of your system or the internal identifier of the user in the system described in the HCI-Software field. For personalized functions (e.g. 7601001234567 or maxmiller@insel.ch or mm63) [base64]
HCI-UserName	**Display name of the user (e.g. "Max Miller") [base64]

* Indicates that the header is **mandatory** and must not be empty.

The header field values must use ASCII encoding according to the standard. Exempt are the few custom "HCI-*" fields that optionally also accept [base64] encoding; these must use UTF-16 (Windows/.NET default).

Use the base64 encoding if your values can contain characters outside the ASCII range, such as umlauts. In such a case, provide the base64-string inside square brackets (ASCII 91 for "[" and ASCII 93 for "]") as value.

Integration APP (UI) and of option 3 in chapter 6.6 Integration API.

6.2 CDS Vac Check status

For each indication the check gives a vaccination status, which shows, if the vaccination is complete, incomplete etc. (see <https://hcsolutions.ch/ig/ig-hci-vacd/site/ValueSet-hci-vacd-cds-vaccination-status-vs.html>)






Using our icons for showing the relevance is mandatory, due to safety and risk reasons. The icons are available for free to use as SVG, PNG (40x40) and ICO (16/24/32) files through the following link:
https://documedis.hcisolutions.ch/resources/CDS_2021-01.zip

Status	Description	Code
Vaccination complete	The patient has either received all required vaccine doses or he has a sufficient immunity (e.g., indicated through a high antibody titer).	VC
Vaccination incomplete	The patient has either not received all required vaccine doses or he has an insufficient immunity (e.g., indicated through a low antibody titer).	VIC
Vaccination not received	The patient has not received any vaccine doses.	VNR
Vaccination irrelevant	The vaccine is not relevant for this patient (e.g., because of his age).	VIR
Vaccination not evaluable	The vaccination is not evaluable for example, because of lack of information.	VNE

6.3 CDS Vac Check relevancies

Each risk for a vaccination is encoded with a code and an associated icon. Please be aware, that the meaning of these icons is slightly different from the Med Check relevancies. (see <https://hcisolutions.ch/ig/ig-hci-vacd/site/ValueSet-hci-vacd-cds-relevance-vs.html>)

Using our icons for showing the relevance is mandatory, due to safety and risk reasons. The icons are available for free to use as SVG, PNG (40x40) and ICO (16/24/32) files through the following link:
https://documedis.hcisolutions.ch/resources/CDS_2021-01.zip

Icon	Description	Code
	Service not available. Due to technical reasons, this check is not available.	ServiceNot Available
	Contraindicated This vaccination is contraindicated for this patient because of a risk factor.	KI
	Consult practitioner A practitioner should be consulted because of a certain risk factor (e.g., pre-existing illness or pregnancy)	CP
	Not relevant If a vaccination is not relevant because of a risk factor.	NR
	Indicated There is no risk in giving the patient this vaccination.	I

6.4 Request in general

The interface is specified in detail in the implementation guide.

It is available here: <https://hcisolutions.ch/ig/ig-hci-vacd/site/index.html>.

You will find here a summary of the main information without details on the different payloads / responses

The interface of the Vac Check conforms to FHIR. The payload of a typical Vac Check request looks like this:

```
{
  "hook": "vaccination-check",
  "hookInstance": "0a9acefb-a68a-4067-a686-f622be699278",
  "context": {
    "bundle": "Bundle/CdsGenericFormToCdsRequestMessageBundle"
  },
  "prefetch": {
    "bundle": <--- prefetched Bundle resource goes here
  }
}
```

The *bundle* must follow the requirements according to the profile CH VACD Message Immunization Recommendation Request : <https://fhir.ch/ig/ch-vacd/StructureDefinition-ch-vacd-recommendation-request-message.html>.

Additionally, the following headers must be sent for any request to CDS Check.

Key	Type
Authorization* (When used as Header field) access_token (When used as Form parameter)	Bearer token, e.g. "Bearer yourBase64TokenReceivedFromHCI"
Accept-Language	Content language (string, de-CH / fr-CH). All data is available in German or French only. If no such header is provided, the API defaults to German content. For French, put "fr-CH". When calling the APP, this can also be part of the URL route
HCI-CustomerId*	**The identifier of the INDEX subscriber using this software instance. If the end user has an INDEX login, this is the numeric part of his INDEX username. If the end user does not have an INDEX login, but only has a subscription, this is the GLN
HCI-Index*	**The INDEX variant that shall be used by the service (e.g. "hospINDEX"). Casing is irrelevant. Used by HCI to verify with internal subscriber data (check if CustomerId has matching INDEX subscription)
HCI-SoftwareOrgId*	**The PartnerId of the software company responsible for this software. Must have INDEX contract. The number part of your EPNxxxxx@hcisolutions.ch account. Might be verified by HCI with subscriber data to check if the software company indeed has the necessary access level.
HCI-SoftwareOrg*	**The Description of the software provider responsible for this software, must have an INDEX software provider subscription. The manufacturer of the application (e.g. "YourCompany GmbH") [base64]
HCI-Software*	**The name of the application instance / installation that is calling the HCI services (e.g. "KIS Unispital Bern" or "Medfolio KSSG"). Needed to identify the system in case of usage problems. Name must be known by IT-responsible of the installation operator as identified in HCI-CustomerID.** [base64]. Good practice would be to use the same string as the one stored in the token description.

HCI-UserId	**The validated GLN of the HealthCareProfessional or the validated (!) Swiss-Rx-Login of the user of your system or the internal identifier of the user in the system described in the HCI-Software field. For personalized functions (e.g. 7601001234567 or maxmiller@insel.ch or mm63) [base64]
HCI-UserName	**Display name of the user (e.g. "Max Miller") [base64]

* Indicates that the header is **mandatory** and must not be empty.

The header field values must use ASCII encoding according to the standard. Exempt are the few custom "HCI-*" fields that optionally also accept [base64] encoding; these must use UTF-16 (Windows/.NET default).

Use the base64 encoding if your values can contain characters outside the ASCII range, such as umlauts. In such a case, provide the base64-string inside square brackets (ASCII 91 for "[" and ASCII 93 for "]") as value.

6.5 Integration APP (UI)

6.5.1 Request Structure

Headers

Key	Values	Content
Accept	text/html or application/pdf	The format of the CDS Vac check response, HTML or PDF

Here is how to build a url to the CDS application:

Template : {baseAppUrl}/{culture}/vaccination

- baseAppUrl : f.ex. for integration <https://int.ce.documedis.hcisolutions.ch/cds/2021-01/app>
- culture (optional) : 'fr-CH' or 'de-CH' if not specified, CDS will take the default language specified in browser. You can alternatively define it in the 'Accept-Language' header.

6.6 Integration API

6.6.1 Request

Headers

Key	Values	Content
Accept	application/json+fhir	The only format supported by the API

Please refer to '6.4 Request in general'

6.6.2 Response

The response will follow this structure

```
{
  "cards": [
  ],
  "systemActions": [
  ]
}
```

For more details, please refer to the Implementation Guide HCI-VACCD : https://int.hcisolutions.ch/ig/ig-hci-vacd/site/vaccination_check_response.html.

6.7 Error Handling

The following errors could be returned by the CDS Service:

Error	Description
Unauthorized (401)	Your request has been rejected because you are not authorized to used the service. Please check your token and HCI Headers (please refer to 4.5 and 5.4).
Forbidden (403)	You are authenticated but not authorized, please contact the hotline
Unprocessable entity (422)	You request is not valid because of structure of the body or semantic errors. Please pay attention of the description contained in the response body, you should find the error.
Internal Server error (500)	Something does is wrong on our side, please try again and contact us if the problem persists.

6.8 Acceptance criteria's for verification of installation

An acceptance test must be carried out at the end of the integration and before going live.

7 Additional Tools

7.1 Swagger API documentation

All routes provided by our CDS API service are described via swagger. You can find this documentation here : <https://ce.documedis.hcisolutions.ch/cds/2021-01/api/docs/index.html>

It is possible to test directly the calls to the different routes from this interface

7.2 Examples

You will find a list of curls and self-posted html forms which could help you to implement the interface to our services.

Med Check

- Curls
 - Summarized check
 - Detailed check
 - Print check (PDF), grouped by checks
 - Print check (PDF), grouped by medicaments
- Self post forms
 - Display Med check
 - Display Med check (with interaction tab active by default)

Vac Check

- Curls
 - Generic Check
 - Flu Check (Influenza)
 - Print Check (PDF), Generic Check
- Self post form
 - Display generic check

You will find all these examples here : https://documedis.hcisolutions.ch/resources/CDS_2021-01_Examples.zip

8 Support

Technical and content-related errors or deficiencies in the context of the use of CDS.CE, which are detected by the users or by the software house partner, must be reported to HCI Solutions within two working days via 058 851 26 00 or hotline@hcisolutions.ch after their discovery and preliminary clarification by the IT department of the users or by the software house partner. On weekends and holidays, the on-call number 022 304 62 61 is available. This applies in particular to serious incidents with a reporting obligation in accordance with the Medical Devices Ordinance (MepV).

HCI Solutions keeps a corresponding log of the error/defect reports communicated to it in this way. Prioritization of the error/defect reports is at the discretion of HCI Solutions. The elimination of errors/defects shall be carried out exclusively in coordination with the respective current development planning of HCI Solutions and/or the requirements of the MepV. Any further warranty claims in connection with Documedis CDS.CE do not exist and are hereby excluded.

9 Appendix

9.1 Example eMediplan

If you need some initial example data, you can find it in the demo applications or you can use the fictive test example below. It includes a large number of medications with various risks.

```
CHMED16A1H4sIAAAAAAAC72VTY/aMBCG/8rK10I3NvmA3EojtqiWjQjdQysOIZkiUYIdOU4livLfdxwD3dMiKE
LCYvJ6PH7mVWLvSRirHLgi/p5MnuMtEJ8EQsakR2aHxycZr0GiMA4wjdCR7fQp7bMBSk/AU5zzWY9ESgLoBJ
R/5ZUJvuZqZ6IZ32CQAoZhJrgujOEcUr1zMKvVHLjRQglb4Is9skil/3tPpphitz0TOCij6IjndZSYkRzPPkn0II28kzQ
4Bu4xna7alSal626b5a6CbuVLXCLISLf3k+fYEdNLzTQ7TIPXOc3TdtW2XS95gpZxZQrzcjIptTGzGlqCtjYnzDzg
ZplgZ0SZtFh32L4w8RALYXxYcoXUHdGBJhvfzbZ6Fif+x9Gxm+1JtPyO6ctis6i1hZF11xI4Rz+xVRGjFP7QIVRdtah
Zm7LP6zBOCs1/sIZQiw3drrP/5n3HeoY3gEpCXefict6BPaDwfWnHZaMykWSpbJLi8RvIv1e4PBwOb4pNz2JP+
SsU6hqPqUVtj3r3dTmMZZHzWvCHxwesoEp8QUrYXA5vj9yboL/D1m5/gD5v6gLKPyDrKua8wWPvcsdvBK39P
o6P/X5BXCWq1ytxHXbT9+M8r/7uZLZT2bapLwemzPPcOxNHI5/KWCuc5FCmmkw/REkGW73S3JynG6vrCrUv
eDSZqLup/3WwtJhPqc8GnzCw9NGz2OIWOHovs3F3RbdvfmCmRgwIAAA=
```



9.2 Example Vac Check Request

https://index.hcisolutions.ch/docs/tec_doc/Vaccination/ExampleCdsVaccinationRequest.json

9.3 Example Vac Check Response

https://index.hcisolutions.ch/docs/tec_doc/Vaccination/ExampleCdsVaccinationResponse.json

10 Marking

Documedis CDS.CE	
	
LOT	3.0.3.1
	HCI Solutions AG Untermattweg 8 3027 Bern Schweiz hotline@hcisolutions.ch Tel. +41 58 851 26 00 https://www.hcisolutions.ch/

11 Version History

Version	Changes	Author
V1.0	Initial version release 2021-01	lfl/tst
V1.1	Chapter 2 and 6.2.4: Change of the Documedis URL Chapter 3 and 5: Change of the "Documedis Modules" graphics Chapter 4.2: New icon "Not transmitted products" added	lfl/tst
V1.2	Chapter 6.2.3: Explanation of risk ID 613 for reproduction Chapter 6.1: Small changes Chapter 6.2.1: Note in the helpURL field: If empty the "help" button is not shown	lfl
V2.0	Complete revision	lfl/ccr
V2.1	Chapter 5.8: New acceptance criterias Chapter 5.4: Key «CustomerId» new GLN instead of INDEX-Login number Chapter 5.2: Date of birth as minimal input data reproduction	lfl
V2.2	Chapter 10: update lot	lfl
V2.3	Chapter 10: update lot	lfl
V2.4	Chapter 10: update lot	lfl