



Machine-readable and interoperable
age classification labels in Europe

Grant agreement no: 621059

MIRACLE 2.0 Implementation Report

Implementing the updated MIRACLE specification in five different schemes

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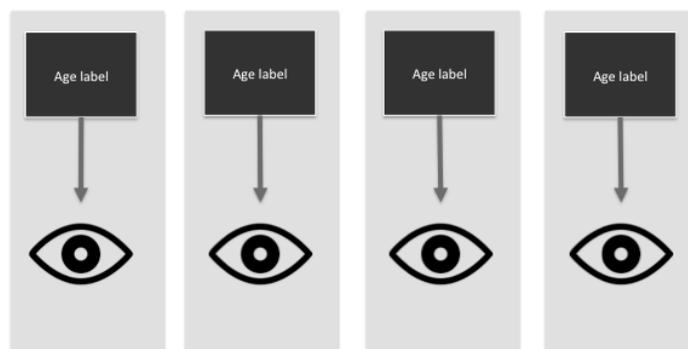
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A. Background and objective of MIRACLE

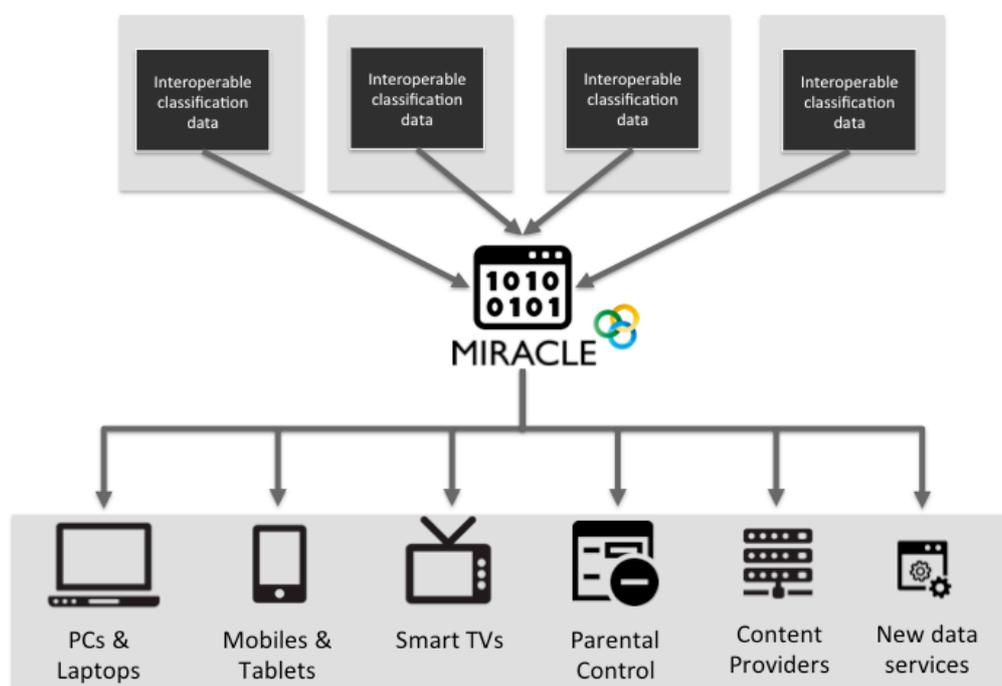
Information about media content is deemed an important aspect for ensuring rational consumer decisions in the digital market. In the field of suitable and unsuitable content for children, many EU member states rely on age classification procedures and visual age labels. By informing children and parents about relevant media content, such age labels empower them to exercise informed choices regarding media usage, literacy and education.

Diag. 1: Status quo - National, media- and scheme-related age classification silos



However, age ratings and classification schemes are highly fragmented among the Member States and – in many cases – rely on visual labels only. In digital contexts, though, *electronic* age labels open the chance for exchanging and processing classification information in digital realms. Given that one common data model is being used across borders and platforms, such an approach could fully utilise the knowledge comprised in these labels – for the benefit of both end users and businesses along the supply chain and across borders, regions and devices.

Against this background the MIRACLE project (“Machine-readable and interoperable age classification labels in Europe”) aims at providing one data model for electronic age classification information, implementing it in different classification schemes and showing the added value of interoperable classification data for businesses, educational institutions and end users. The eight project partners spread across five different member states and classification schemes, consisting of classification bodies, Safer Internet nodes, self-regulatory bodies and filter software providers. The 30-month technical pilot started in spring 2014 and is co-funded by the “ICT Policy Support Programme” within the CIP (“Competitiveness and Innovation Framework Programme”) of the European Union.

Diag. 2: Advantages of interoperable age classification data

After an initial draft and a public consultation phase, the project members published Version 1.0 of the MIRACLE specification in autumn 2014. With Version 1.0 the data model took into account current classification schemes and practices while considering existing electronic labelling schemes in order to be easily adapted. Its unrestrictive and open approach leaves enough flexibility for existing and future schemes to map their classification data to MIRACLE. More so, it even enables them to extend the specification to deliver more metadata, if desired. With the actual age label still at its core, the data model also provides fields for content descriptors and – for interactive media content – feature descriptors, e.g. location-based services.

By February 2015, four consortium partners had implemented the specification in their very own classification scheme context, offering API endpoints that provide MIRACLE datasets. For the first time, interoperable age labels are available across borders: UK-based BBFC, Netherlands-based NICAM as well as the Pan-European Game Information System PEGI have mapped their existing classification data to the MIRACLE data model and offer MIRACLE-compatible access to (parts of) their classification databases. The German FSM provides an online mapping service that “translates” existing age-de.xml labels into MIRACLE data sets on the fly. Moreover, NCBI as the Safer Internet node in the Czech Republic started to pilot a MIRACLE-based database with an API endpoint from summer 2015.

During the implementation phase, valuable experiences and insights have been made by the consortium regarding the overall strategy of implementing an interoperable data model, relevant context factors for opening up classification data to cross-border provision as well as regarding technical aspects of mapping a new specification to existing databases and schemes. Both the decision-making regarding the implementation strategies and the actual implementation steps have been documented by each of the five consortium partners. Based on the experiences made during the

implementation as well as on remarks from industry stakeholders regarding additional requirements in electronic age labels the consortium has published an optimized version 2.0 of the MIRACLE specification in September 2015.

This report summarises the changes that MIRACLE V2.0 brought and how the updated vocabulary has been implemented in the five implementing partner's services. In case a partner made additional changes to his MIRACLE services the summary will point this out.

B. MIRACLE V2.0 changes

The project consortium agreed to publish an amended Version 2.0 of the MIRACLE specification on September 25, after discussing the experiences made with the initial specification. The main change has been the introduction of the new root element <label> to enable more than one dataset within one XML file („feeds“). To cope with different languages of media content, the updated version introduces the new <scope-title>-attribute „language“, defined in an external language code vocabulary (isolangcodes.xsd). This non-mandatory attribute describes the title's language in order to be able to provide e.g. a movie's original title. In parallel to this, the valid attributes of <country-code> are now also referenced externally due to their volatility.

Due to discussions within MIRACLE's working group CHIPSOM (Child protection in social media) it became clear that Version 1.0 wasn't scalable in cases where a content provider's platform contains a huge number of different media pieces with very different age ratings. For these cases Version 2.0 introduces the <scope-api> element, where a content provider can reference an API endpoint that will provide a single MIRACLE dataset if queried with one specific URL.

Especially some of PEGI's stakeholders required the option to provide more metadata within the age label. An additional element within the new overarching <scope-metadata> offers a flexible container to do so. This element can be used for all kinds of metadata related to the content comprised by the label scope, e.g. duration, release year, producer etc.

Version 2.0 also introduces a new <Signature> block, including W3C's xmldsig-core vocabulary to be able to provide either encrypted or digitally signed XML files, enabling IP protected MIRACLE datasets that can be checked for valid information.

C. Implementation of V2.0

The relatively small amendments resulted in an overall feasibility of implementing MIRACLE Version 2.0 in the existing APIs. All partners easily succeeded in making their API output MIRACLE V2.0-valid. Again, the personnel and financial resources that were needed to implement MIRACLE V2.0 haven been low and mainly depended on the scope of individual changes to the API.

BBFC implemented the new overarching <label> element and deployed API keys to limit the API's usage per user.

NICAM switched from a MIRACLE-based frontend search tool to a complete RESTful API. In this context, the API output was shaped to fit the v2.0 specification. Moreover, NICAM extended their API by an optional JSON output.

PEGI amended its API output significantly: Besides the encompassing <label> element, PEGI relocated all relevant metadata from the former <cd-opentext> custom descriptor elements to the newly available <scope-metadata> block. PEGI also deployed an API parameter for JSON output.

FSM added the <label> root element and optimised their API's encoding of special characters.

NCBI implemented the <label> element according to the MIRACLE V2.0 specification.

JusProg is one of the MIRACLE consortium partners that provide parental control software. For this purpose JusProg runs an extensive database of suitable and unsuitable URLs. These URLs have been crawled and pre-rated by automatic bots and have been age rated by a classification team. For the second period of MIRACLE, JusProg opened their internal URL database via a MIRACLE-based API to enable app developers to create prototypes on basis of one of the largest European filter lists. The JusProg API has been built MIRACLE V2.0-compatible from the start.

D. Remaining challenges

Version 2.0 of the MIRACLE specification already solved several issues in comparison to Version 1.0. However, it cannot cope with some structural challenges of electronic classification data as identified in the Ecosystem Report (Deliverable 3.1):

- **Many versions of the same content:**
Especially in the area of feature films it has become clear that producers/studios license their movies to national distributors who often produce specific national versions of the movie due to cultural conventions. There are also several versions of one specific movie in each market, e.g. a cinema version, a DVD version, an extended cut, a director's cut etc. Differentiating between these different national and intra-national versions only on basis of a MIRACLE data set is only possible in cases where additional metadata is available, like for instance file hash values.
- **Web labelling requirements are different from traditional age labels:**
While MIRACLE follows an approach where the age rating hierarchically is in the focus of the dataset, age classification in the open web are usually provided URL-based. This means, however, that sometimes a lot of different URLs at one second level domain carry either the same or very different age ratings. To be efficient, a label specification has to change from age-centred to URL-based labels. MIRACLE already compensates this issue to a certain degree by (a) using wildcards within the <scope-url>-element and (b) by providing the option to use the new <scope-api> element for large-scale websites. Especially for SMBs this might result in too complex implementation requirements. That's the reason the implementation guidelines suggest to use age.xml for pure web labelling.
- **Culturally related scheme hurdles:**
MIRACLE is a specification that does not alter existing classification schemes. It offers a data model that any existing scheme might use. If different national schemes use MIRACLE, the cultural differences between the existing rating schemes will stay the same. MIRACLE make the rating technically interoperable, but not culturally.

However, given enough data from different schemes, big data analyses might apply to identify and consider differences among national schemes automatically.¹

¹ See e.g. the GAM approach that uses big data in classification to calculate probabilities in cross-cultural age ratings, <http://www.srda.eu/project/gam-making-age-labelling-international/>

Annex 1: MIRACLE API endpoints

Here is how to access and test drive the implemented MIRACLE-based services:

BBFC (UK)

The British Board of Film Classification is an independent, non-governmental body which has classified cinema films since it was set up in 1912 and videos/ DVDs since the Video Recordings Act was passed in 1984. The BBFC database currently carries data for approximately 320,000 classification decisions upon which an abstraction layer, specifically designed to aid interoperability with third parties sits on top. BBFC's database already is accessible for customers via a RESTful web API in combination with an API licence key. The BBFC scheme has been readily mappable to the MIRACLE specification, the existing API/data service has been extended to provide the data accessible in a MIRACLE-based format, both in XML and in JSON.

Web frontend & documentation

<http://developer.bbfc.co.uk/>

Login and Password are
"miracle"

API Base URL

<http://api.bbfc.co.uk/miracle/v1>

API key

on request

Sample query

[http://api.bbfc.co.uk/miracle/v1/games/match?title=Assassins
creed&format=XML&apiKey=key](http://api.bbfc.co.uk/miracle/v1/games/match?title=Assassins%20creed&format=XML&apiKey=key)

NICAM (NL)

NICAM stands for the Netherlands Institute for the Classification of Audio-visual Media. The institute enjoys broad support within the audio-visual sector in the Netherlands and is responsible for the coordination of the Kijkwijzer classification scheme. NICAM, too, uses a central database for the classification information. This database consists of around 46.000 classifications already accessible by third parties via an API. The data is accessible freely, however, access is granted through NICAM based on a specific IP (range). The NICAM data scheme has been mapped to the MIRACLE specification. As a technical demo, a front-end interface has been developed that allows queries to a part of the NICAM database resulting in MIRACLE-compatible results.

Web frontend

<http://api.kijkwijzer.nl/hackathon/index.php>

API Base URL

<http://api.kijkwijzer.nl/hackathon/api.php>

Mandatory parameters for the API call are (for now) either one of:

- id (integer): query one exact result in the NICAM database. The id must be a movie that has been unlocked for the Hackathon
- q (string): query at most 10 results containing the value of 'q' in the title and/or subtitle of the movie

Optional parameters are:

- output (string): can be either 'xml' or 'json', defaults to 'xml'
- callback (string): only used with output=json to provide a callback method for JavaScript, defaults to empty

API key

None needed

Sample query

<http://api.kijkwijzer.nl/hackathon/api.php?q=Saw>

PEGI (pan-european)

PEGI SA provides the infrastructure for the PEGI rating system, offering age classifications for video game products in the form of an official license. Its classification data consists of different elements, including but not limited to product and company ID, release date, genre, technological platform, stage in the rating process, date of (re-)rating, applicable country(ies), etc. The central database holds more than 20.000 ratings and consists of an additional security layer managing access by a large amount of individual customers. The internal data scheme has been mapped to the MIRACLE specification, now offering an API access that gives back MIRACLE-based XML feeds.

Web frontend & documentation

n.a.

API Base URL<http://api.pegi.eu/>**API key**

on request

Sample query

<http://api.pegi.eu/public/search/key/{API-Key}/title/{game-title}/fromDate/{from-date}/toDate/{to-date}/platform/{platform-name}/publisher/{publisher-name}/age/{age-rating}>

FSM (DE)

In Germany an electronic labelling standard is in effect since 2011 (age-de.xml). Content providers and website owners are allowed to self-label their content by using labels based on age-de.xml. Objective of FSM's implementation of the MIRACLE specification in the German context has been to translate these national labels into MIRACLE-compatible data sets. FSM provides a translation service that maps age-de.xml content on MIRACLE elements. FSM's translation service works on-the-fly and is accessible both via a graphical frontend and via a RESTful API.

Web frontend & documentation<https://www.altersklassifizierung.de/en/miracle>**API Base URL**<http://api.altersklassifizierung.de/>**API key**

None

Sample query

<http://api.altersklassifizierung.de/?url=http%3A%2F%2Fwww.fundorado.de%2Ffree%2F>

NCBI (CZ)

The Czech partner of the MIRACLE consortium has the unique national context that no electronic labels or online classifications are in place yet. This makes NCBI's starting point look like a test case for future national users of the MIRACLE approach.

Web frontend <http://miracle.vekovaklasifikace.cz/>

**&
documentatio
n**

API Base URL http://miracle.vekovaklasifikace.cz/api/v1/search?name=name_of_record

API key None

Sample query <http://miracle.vekovaklasifikace.cz/api/v1/search?name=gta>

JusProg (DE)

JusProg provides an API for its renowned filter list classifying millions of websites for parental control systems.

**Web frontend &
documentation** <http://miracle.labeloffice.com/client.php>
Documentation in extra document

API Base URL <http://miracle.labeloffice.com>

Sample query <http://miracle.labeloffice.com/json.php?url=www.example.com&age=12&par=iZ4v&cou=de&tok=aa1d846f&list=all&f=x>

API keys On request

Annex 2: V2.0 Implementation Reports



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MIRACLE 2.0
Implementation
British Board of Film Classification

January 31st, 2016

Editors: Stephen Hopkins (shopkins@bbfc.co.uk)

Changes and implementation of v2.0

Building on the great design of v1, little was needed in way of code changes to achieve the desired v2.0 data model.

The thrust of the change was to encapsulate the JSON output within a 'label' root element, to better define the data, allowing multiple versions of a film to be returned if they exist. The new JSON output is shown in figure 1.

```
1  {
2    "label": {
3      "age-declaration": {
4        "issuer": {
5          "age-issuer": "BBFC",
6          "issuer-url": "http://www.bbfc.co.uk",
7          "issuer-licence": "http://www.bbfc.co.uk/sites/default/files/attachments/BBFC%20Digital%20Licence_0.pdf",
8          "country": [
9            "GB"
10         ]
11       },
12       "scope": {
13         "scope-ids": {
14           "BBFC-codenum": "AZF253609"
15         },
16         "scope-titles": {
17           "BBFC-title": "UP"
18         }
19       },
20       "rating": {
21         "age": 4,
22         "age-adds": {
23           "BBFC-category": "U"
24         },
25         "age-icons": {
26           "BBFC-symbol": "http://api.bbfc.co.uk/symbols/U.png"
27         }
28       },
29       "content-descriptors": {
30         "cd-opentext": {
31           "BBFCInsightShort": "Contains mild threat"
32         }
33       }
34     }
35   }
36 }
37
38
```

Figure 1 – v2.0 JSON output with new label element

This presented no problems, but did allow for better granulation of the datasets. The changes were made in-house (as was the original API work), so development time was kept relatively short and therefore costs low.

Initially we had issues in mapping the many versions of theatrical films to the JSON output, but this turned out to be a bug, rather than anything logical within the system and quickly resolved.

The new <label> root element was ready in time for the MIRACLE Hackathon, and seemed to be made good use of, with no errors reported.



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V2.0 Implementation Report

NICAM – Netherlands Institute for the Classification of Audiovisual Media

January 20th 2016

Editors: Martijn Huigsloot (martijn@nicam.nl)
Wim Bekkers (wim@nicam.nl)

MIRACLE V2.0

The first implementation phase of the MIRACLE specification clearly showed the need for multiple outcomes on one query. Therefore the change to the MIRACLE data model in version 2.0 which needed implementation into the NICAM/ Kijkwijzer API was the additional root element <label> which has been added to allow support for multiple labels, e.g. combined information for different versions of a movie or television program. This change is especially important for the Kijkwijzer database in relation to the number of identical titles on multiple platforms such as movies broadcasted and shown in cinemas and or on DVD/ VOD.

Additional to MIRACLE V2.0 we also implemented the JSON version of the output.

Implementation of MIRACLE V2.0

The NICAM MIRACLE API was put into practice by our subcontractor with whom we have been working in the field of age classification and electronic content labelling for a long time.

After MIRACLE 2.0 was approved in September 2015 we provided them with the new syntax. Since the subcontractor was familiar with the system and the discussions around web labelling, they were able to change the output format rather quickly and without charging us for it.

After they had finished the implementation, we ran a number of tests, using labels we had gathered during our implementation strategy research, delivering the desired results.



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MIRACLE 2.0
Implementation
Pan European Game Information PEGI SA

January 20th, 2016

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Simon Little (simon.little@pegi.eu)

One of the main outcomes of the previous implementation phases is that there is a clear need for additional metadata of the PEGI database to be added to the MIRACLE specification and included in the MIRACLE API. After intense discussions on how custom fields within MIRACLE should carry these additional metadata, members decided to designate all content-related metadata, as opposed to rating-related metadata to a specific place within the MIRACLE v2.0 specification. Consequently, all metadata that was currently provided in the <cd-opentext> field needed to be moved to the <scope-metadata> block with the exception of Consumer Advice, Brief Outline and Rating Issues elements.

In addition, the subcontractor was asked to restructure how some of the data are provided in the MIRACLE API. Instead of using the <customer-licence> element for pointing at the publisher who has received the PEGI rating and the <scope-url> element for referencing that studio's homepage, these types of information should now be used in the newly added <scope-metadata> block (e.g. <scope-meta class=„Publisher“ />Take 2 Interactive<scope-meta> or <scope-meta class=„PublisherURL“ />www.take2games.com/<scope-meta>). The <customer-licence> field should be used for data licenses that provide the data within their own contexts (e.g. a webshop or a studio's website). The <scope-url> element is reserved for labelling online resources.

Moreover, as the PEGI data provided by the API sometimes contains a lot of different data sets within one XML file the subcontractor made suggestions on how to optimize the specification in a way that allows MIRACLE to also transport huge numbers of dataset within one MIRACLE data feed (see 1st Progress Report). This has now been implemented in MIRACLE v2.0 as well. Finally, we asked the subcontractor to extend the PEGI MIRACLE API allowing users to extract the MIRACLE data in a JSON format too. An additional parameter in the API syntax will allow users to choose the required output format. Each of these additional changes created a small increase in the budget for subcontracting costs.



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V2.0 Implementation Report

Freiwillige Selbstkontrolle Multimedia-Diensteanbieter e.V.

January 20th 2016

Editors: Martin Drechsler (drechsler@fsm.de)

Maren Pees (pees@fsm.de)

What is new in MIRACLE V2.0?

The MIRACLE API provided by the FSM allows the automatic translation of existing age-de.xml web labels into the MIRACLE data model. The API enables software, devices or services which do not understand German web labels but are capable of interpreting MIRACLE to use age information provided by the owner of a website.

The only change to the MIRACLE data model in version 2.0 which needed implementation into the FSM translation service is the additional root element `<label>` which has been added to allow support for multiple labels, e.g. combined information for different versions of a movie. This is not to be mixed up with the ability of age-de.xml which allows multiple labels in one file: In order to determine the relevant information for a specific scope, the age-de.xml format relies on hierarchy (order of elements) to achieve a complete labelling of any complex website. It is possible to assign different age levels to different parts (pages, directories, subdomains) of a website. In contrast, MIRACLE labels cannot do this and are not supposed to do this by definition. The FSM MIRACLE API must be queried with an individual URL and will therefore return age information for that specific URL. The output label contains either the information for the complete website (only one age level is specified in the age-de.xml file) or the age information for the specified URL (complex label in age-de.xml file).

Other changes in version 2.0 concern elements that have no equivalent data in age-de.xml files, therefore it is not necessary to add these optional elements into the output of the FSM translation service.

Example listings:

MIRACLE dataset version V1.0 as previously returned from

<http://api.altersklassifizierung.de/?url=http%3A%2F%2Fwww.bundespruefstelle.de%2Fbpjm%2FService%2Fenglish.html>

```

1. <?xml version="1.0" encoding="UTF-8"?>
2. <age-declaration xmlns="http://www.miracle-
   label.eu/ns/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
   instance" xsi:schemaLocation="http://www.miracle-label.eu/ns/miracle-1-0.xsd">
3.   <issuer>
4.     <age-issuer>www.jugendschutzprogramm.de</age-issuer>
5.     <last-change>2013-12-06</last-change>
6.     <country>
7.       <country-code>DE</country-code>
8.     </country>
9.   </issuer>
10.  <scope>
11.    <scope-urls>
12.      <scope-url class="web-url">www.bundespruefstelle.de/*</scope-url>
13.    </scope-urls>
14.  </scope>
15.  <rating>
16.    <age>0</age>

```

```
17. </rating>
18. </age-declaration>
```

MIRACLE dataset version V2.0 as currently returned from

<http://api.altersklassifizierung.de/?url=http%3A%2F%2Fwww.bundespruefstelle.de%2Fbpjm%2FService%2Fenglish.html>

```
1. <?xml version="1.0" encoding="UTF-8"?>
2. <label xmlns:ds="http://www.w3.org/2000/09/xmlsig#" xmlns:vc="http://www.w3.org/200
7/XMLSchema-versioning" xmlns="http://www.miracle-
label.eu/ns/2.0/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://www.miracle-label.eu/ns/2.0/
http://www.miracle-label.eu/ns/2.0/miracle-2-0.xsd">
3.   <age-declaration>
4.     <issuer>
5.       <age-issuer>www.jugendschutzprogramm.de</age-issuer>
6.       <last-change>2013-12-06</last-change>
7.       <country>
8.         <country-code>DE</country-code>
9.       </country>
10.    </issuer>
11.    <scope>
12.      <scope-urls>
13.        <scope-url>www.bundespruefstelle.de/*</scope-url>
14.      </scope-urls>
15.    </scope>
16.    <rating>
17.      <age>0</age>
18.    </rating>
19.  </age-declaration>
20. </label>
```

(Minor change, not related to version 2.0 of the MIRACLE data model: `class="web-url"` was removed from element `scope-url` as it did not carry any information.)

Implementation of MIRACLE V2.0

The FSM MIRACLE API was put into practice by our subcontractor with whom we have been working in the field of age classification and electronic content labelling for a long time.

After MIRACLE 2.0 was approved in September 2015 we provided them with the new syntax. Since the subcontractor was familiar with the system and the discussions around web labelling, they were able to change the output format rather quickly and without charging us for it.

After they had finished the implementation, we ran a number of tests, using `age-de.xml` labels we had gathered during our implementation strategy research. Some issues occurred around the encoding of special characters. We spotted them and were able to have them fixed immediately.



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V2.0 Implementation Report

The Czech National Safer Internet Centre (NCBI)

January 31st 2016

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MIRACLE v2.0 and implementation needs

The showcase, which demonstrates the whole capabilities of MIRACLE age labelling, runs on the website <http://miracle.vekovaklasifikace.cz/>. Showcase consists of 100 items and demonstrates the age labelling capability of three types of records: videogames, movies and websites. The early first implementation of MIRACLE v1.0 has been done during the summer last year. All dataset and XML implementation matched its definition.

After MIRACLE v2.0 has been issued, we checked the changes, compared it with actual definition and came to the conclusion, that only one thing had to be implemented. It was the additional root element <label>. The implementation of this element has been only the question of enlarging running version of this input. This implementation allows us returning in API one XML with more records, each record in one label element. Searching into the database could return one XML using the API with all results and it could be used according to further implementation.

Miracle v2.0 current dataset listing:

```
<?xml version="1.0" encoding="UTF-8" ?>
<label xmlns:ds="http://www.w3.org/2000/09/xmlsig#"
xmlns:vc="http://www.w3.org/2007/XMLSchema-versioning"
xmlns="http://www.miracle-label.eu/ns/2.0/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.miracle-label.eu/ns/2.0/ http://www.miracle-label.eu/ns/2.0/miracle-2-0.xsd">
  <age-declaration>
    <issuer>
      <age-issuer>NCBI</age-issuer>
      <issuer-url>http://www.ncbi.cz/</issuer-url>
      <issuer-licence>http://www.ncbi.cz/license</issuer-licence>
      <last-change>2015-06-28</last-change>
      <country>
        <country-code>eu</country-code>
        <country-code>CZ</country-code>
      </country>
    </issuer>
    <scope>
      <scope-titles>
        <scope-title class="NCBI-title-cs">GTA V</scope-title>
        <scope-title class="NCBI-subtitle-cs" />
      </scope-titles>
    </scope>
    <rating>
      <age>18</age>
    </rating>
  </age-declaration>
</label>
```

Implementation of MIRACLE v2.0: Problems

The implementation of the MIRACLE v2.0 specification brought us one problem with validation against the MIRACLE v2.0 XSD schema. Probably due to issues with external schemas, on which are the links from main schema for v2.0 defined, the validation failed.

After number of tests we came to the conclusion, that this was only one issue we faced during MIRACLE v2.0 implementation process.