



Service Unit Terminological Services

The NPM infrastructure
of the SU-TermServ

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Historical Context

- Origins of the SU-TermServ project within the HiGHmed consortium
- Resources had evolved organically over time in response to ad-hoc requests (“historisch gewachsen”)
- Little to no insight to consumers about resources available on the server
- Little to no insight to us about responsibilities, provenance, ...
- Re-deployment and new strategy starting 2024

Strategy 2024

- Management of resources no longer using ad-hoc requests
- Consistent use of FHIR NPM Packages for resource management
- Separation of concerns in the packages
- Rigid QA/QC processes for deployment of new packages
 - Availability of all dependencies of the contained terminologies
 - Availability of dependent resources coming from profiles in the managed resources
- Scope not limited to KDS packages and dependencies, users can request resources for other project.
- Package-based deployment enables deterministic setup of mirrored servers
- Transparency by design
- Node package tooling can be brought to the table.

FHIR NPM Packages

- Part of the FHIR specification as of R5
- Adapted from internet-specific specifications originally for distribution of JavaScript code
- Already in broad use in the FHIR community, including the MII
 - Primary distribution format of the MII CDS
- Packages distributed via a registry, most commonly registry.fhir.org (c/o simplifier.net)
- Packages form a graph based on their dependencies.

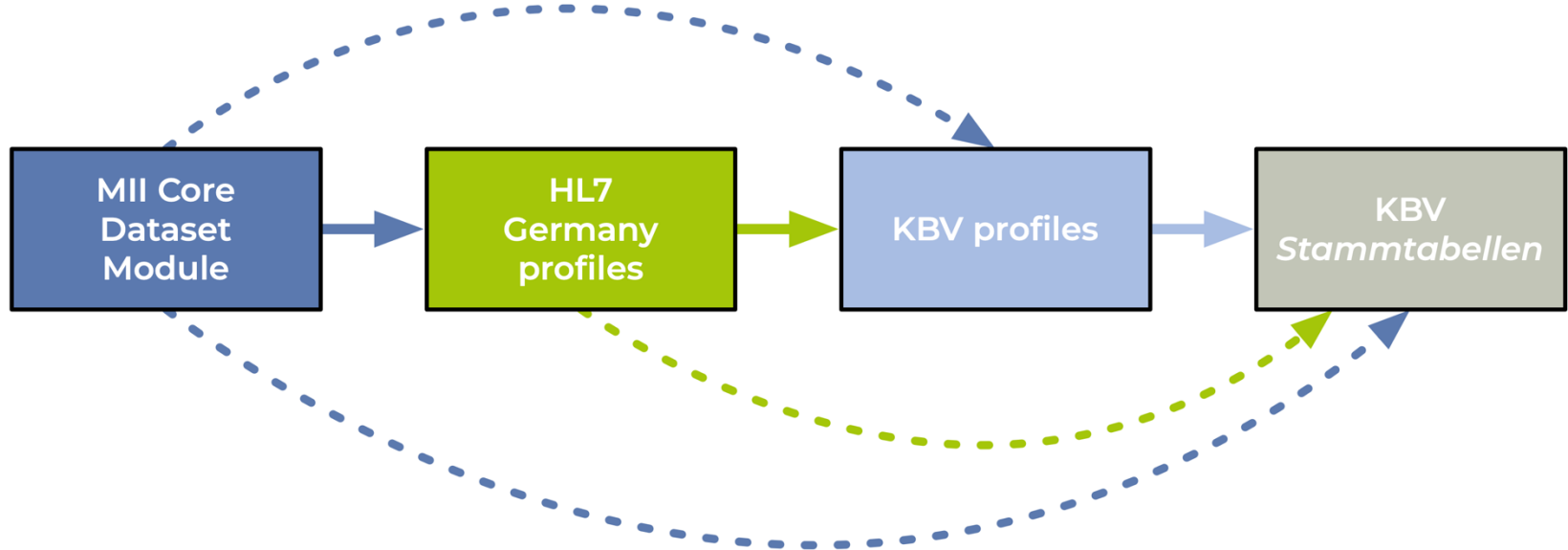
```
├─ package
│  ├── .index.json
│  ├── CapabilityStatement-mii-cps-person-cap-stat.json
│  ├── CodeSystem-mii-cs-person-vitalstatus.json
│  ├── MII_IG_Person_DE_v2024.json
│  ├── SearchParameter-mii-sp-person-adresszusatz.json
│  ├── SearchParameter-mii-sp-person-assignerpid.json
│  ├── StructureDefinition-mii-lm-person.json
│  ├── StructureDefinition-mii-pr-person-patient-pseudo.json
│  ├── StructureDefinition-mii-pr-person-patient.json
│  ├── StructureDefinition-mii-pr-person-proband.json
│  ├── StructureDefinition-mii-pr-person-todesursache.json
│  ├── StructureDefinition-mii-pr-person-vitalstatus.json
│  ├── ValueSet-mii-vs-person-vitalstatus.json
│  └─ examples
│     ├── Condition-mii-exa-person-condition-todesursache.json
│     ├── Observation-mii-exa-person-observation-vital.json
│     ├── Patient-mii-exa-person-patient-full.json
│     ├── Patient-mii-exa-person-patient-minimal.json
│     ├── Patient-mii-exa-person-patient-pseudonymisiert.json
│     └── ResearchSubject-mii-exa-person-researchsubject.json
├─ icd10who2016.json
├─ icd10who2019.json
└─ package.json
```

NPM package.json

```
{
  "name": "de.medizininformatikinitiative.
kerndatensatz.person",
  "version": "2024.0.0",
  "description": "Medizininformatik Initiative - Modul Person",
  "author": "juliansass",
  "keywords": [ "MII", "KDS", "Person", "Patient" ],
  "license": "CC0-1.0",
  "homepage": "<mii.de>",
  "directories": {
    "lib": "package",
    "example": "examples"
  },
  "title": "MII IG Person",
  "fhirVersions": [ "4.0.1" ],
  "maintainers": [ { "name": "Medizininformatik Initiative" } ],
  "jurisdiction":
"http://unstats.un.org/unsd/methods/m49/m49.htm#276",
  "dependencies": {
    "de.medizininformatikinitiative.kerndatensatz.meta":
"1.0.3",
    "de.basisprofil.r4": "1.4.0"
  }
}
```

Original package from Simplifier

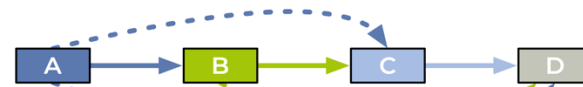
Transitive relationships in NPM packages



NPM package.json

```
{
  "name": "de.medizininformatikinitiative.kerndatensatz.person",
  "version": "2024.0.0",
  "description": "Medizininformatik Initiative - Modul Person",
  "author": "juliansass",
  "keywords": [ "MII", "KDS", "Person", "Patient" ],
  "license": "CC0-1.0",
  "homepage": "<mii.de>",
  "directories": {
    "lib": "package",
    "example": "examples"
  },
  "title": "MII IG Person",
  "fhirVersions": [ "4.0.1" ],
  "maintainers": [ { "name": "Medizininformatik Initiative" } ],
  "jurisdiction":
"http://unstats.un.org/unsd/methods/m49/m49.htm#276",
  "dependencies": {
    "de.medizininformatikinitiative.kerndatensatz.meta":
"1.0.3",
    "de.basisprofil.r4": "1.4.0"
  }
}
```

Original package from Simplifier



```
{
  "name": "@mii-termserv/de.medizininformatikinitiative.kerndatensatz.terminology.person",
  "version": "2024.0.0-suts.2",
  "title": "Kerndatensatz Basismodul Person",
  "dependencies": {
    "@mii-termserv/hl7.fhir.r4.terminology":
"^4.0.1-suts",
    "@mii-termserv/de.bfarm.icd-10-who":
">=2019.0.0",
    "@mii-termserv/de.hl7.basisprofile.terminology":
"^1.4.0-suts",
    "@mii-termserv/snomed-ct": ">=2024.8.27",
    "@mii-termserv/loinc": ">=2024.8.27"
  },
  "author": "SU TermServ",
  "description": "Terminologieressourcen aus dem Kerndatensatz der MII, Basismodul Person, Release-Version 2024.0.0. Umpaketiert von https://simplifier.net/packages/de.medizininformatikinitiative.kerndatensatz.person/2024.0.0",
  "type": "Conformance",
  "fhirVersion": [ "4.0.1" ]
}
```

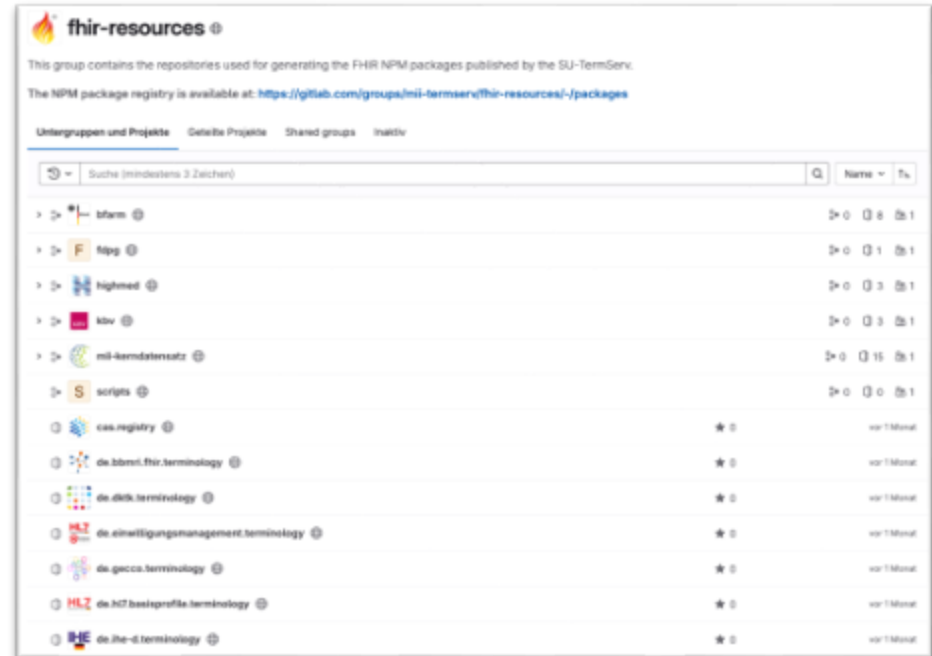
Redistribution of the SU-TermServ

Seperation of concerns

- Resources that are maintained independently of implementation guides should generally be made available in their own packages
- The MII, HL7 Germany and other organizations are not responsible for making versions of the ICD-10-GM or ICD-10-WHO available!
 - This was previously done e.g. in the modules Diagnosis and Patient

NPM Registry of the SU-TermServ

- Implemented using GitLab Packages & CI
- Git repos for each package
- CI job builds & publishes package for each release
- GitLab Registry can be consumed both via NPM tooling and GitLab-specific APIs
- gitlab.com/mii-termserve/fhir-resources
- Transparency by design
- Users can deliver packages as well



Using NPM for FHIR packages



@mii-termserv/de.medizininformatikinitiative.kerndatensatz.terminology.bill-of-materials
v2024.12.31 published 1 month ago
npm de.medizininformatik... 2024.12.31 Last downloaded Feb 19, 2025

Detail Other versions 2

History

- 🕒 @mii-termserv/de.medizininformatikinitiative.kerndatensatz.terminology.bill-of-materials version 2024.12.31 was first created 1 month ago
- 🔗 Created by commit 3584d06d on branch 2024.12.31
- 🔗 Built by pipeline #1613009237 triggered 1 month ago by Joshua Wiedekopf
- 📦 Published to the de.medizininformatikinitiative.kerndatensatz.terminology.bill-of-materials Package Registry 1 month ago

Installation

Show NPM commands ▾

```
npm i @mii-termserv/de.medizininformatikinitiative.kerndatensatz.terminology.bill-of-materials
```

Registry setup

Instance-level
 Project-level

```
echo @mii-termserv:registry=https://gitlab.com/api/v4/packages/npm/ >> .npmrc
```

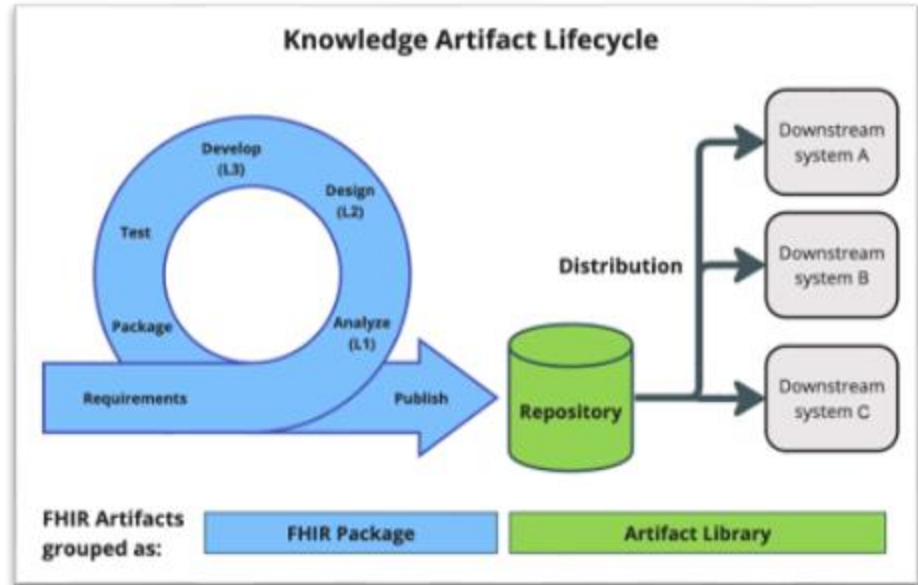
You may also need to setup authentication using an auth token. [See the documentation](#) to find out more.

Assets

Name	Size	Created
📦 @mii-termserv/de.medizininformatikinitiative.kerndatensatz.terminology.bill-of-materials-2024.12.31.tgz	605 B	1 month ago

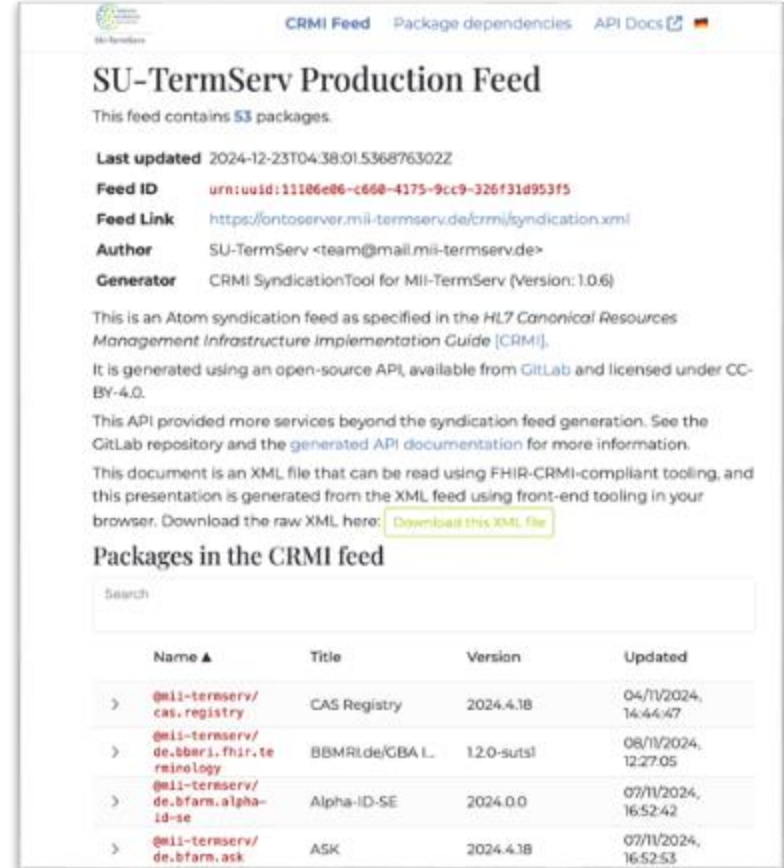
CRMI Implementation Guide

- *Canonical Resources Management Infrastructure Implementation Guide*
 - Maintenance of definitional artefacts including terminology
- Published May 2024
- Requirements for life cycle, distribution mechanisms etc.
- SU-TermServ in the Distribution phase of the life cycle, to support the Implementation phase
 - Minor role in Authoring
- Packaging using NPM packages or FHIR bundles
- Distribution via NPM registry and Syndication Feed



Our CRMI Implementation

- Different to Ontoserver syndication
 - Ontoserver: FHIR resources, SNOMED CT & LOINC
 - CRMI: NPM Packages
- [Open-source tool](#) based on NPM package infrastructure
- Available at ontoserver.mii-termserve.de/crmi
- Generation of Atom feed from loaded packages (“Syndication”)
 - Integration into upload tooling



The screenshot shows the 'SU-TermServ Production Feed' page. It includes navigation links for 'CRMI Feed', 'Package dependencies', and 'API Docs'. The main content area displays the feed's title, a count of 53 packages, and metadata such as the last updated date (2024-12-23T04:38:01.536876302Z), Feed ID, Feed Link, Author, and Generator. A paragraph explains that this is an Atom syndication feed as specified in the HL7 Canonical Resources Management Infrastructure Implementation Guide [CRMI], and it is generated using an open-source API available from GitLab. Below this, there is a section titled 'Packages in the CRMI feed' with a search bar and a table listing packages.

Name ▲	Title	Version	Updated
> @mii-termserve/cas.registry	CAS Registry	2024.4.1B	04/11/2024, 14:44:47
> @mii-termserve/de.oberi.fhir.terminology	BBMRI.de/CBA L.	12.0-suts1	08/11/2024, 12:27:05
> @mii-termserve/de.bfarm.alpha-id-se	Alpha-ID-SE	2024.0.0	07/11/2024, 16:52:42
> @mii-termserve/de.bfarm.ask	ASK	2024.4.1B	07/11/2024, 16:52:53

Our CRMI Implementation

- Interactive window into packages & dependencies we have declared
 - Identification of dependencies based on Dependency Tracing recommendations in the IG
- Planned work: Bring this functionality to the resource level
- SU-TermServ provides approx. 9000 resources across approx. 50 packages
 - More resources than strictly needed
 - “Tree shaking” to provide only needed resources
- CRMI defines further FHIR Operations
 - <resource>/\$package: **Bundle** resource with its dependencies
 - <resource>/\$data-requirements: List dependencies as a **Library** resource

