

Terminology Server: Use and Access

Ontoserver as an essential part of the research IT-infrastructure
within the Medical Informatics Initiative (MII) and the Network of University Medicine (NUM)

Workshop, 28. June 2023

Prof. Dr. Josef Ingenerf

University Lübeck (UzL)

University Hospital Schleswig-Holstein (UKSH), Campus Lübeck

Head of Modul 2b-project „SU-TermServ“

Head of GMDS-Working Group „Medical Terminologies and Classifications“

Using Core Data Sets, e.g. KDS, GECCO

Profile - (on Condition) Diagnose

Canonical: <https://simplifier.net/medizininformatikinitiative-moduldiagnosen-diagnose>

Snapshot

Condition	I		Condition
id	Σ	0..1	System.String
meta	Σ	0..1	Meta
extension	I	0..*	Extension
identifier		0..*	Identifier
clinicalStatus	Σ ?! I	0..1	CodeableConcept <input type="button" value="Binding"/>
verificationStatus	Σ ?! I	0..1	CodeableConcept <input type="button" value="Binding"/>
category		0..*	CodeableConcept <input type="button" value="Binding"/>
severity		0..1	CodeableConcept <input type="button" value="Binding"/>
code	Σ	1..1	CodeableConcept
bodySite	Σ	0..*	CodeableConcept
subject	Σ I	1..1	MII-Reference(Patient Group)
encounter	Σ I	0..1	MII-Reference(Encounter)
onset[x]	Σ	0..1	
abatement[x]	I	0..1	
recordedDate	Σ	1..1	dateTime
recorder	Σ I	0..1	Reference(Practitioner PractitionerRole Patient...)
asserter	Σ I	0..1	Reference(Practitioner PractitionerRole Patient...)
stage	I	0..*	BackboneElement
evidence	I	0..*	BackboneElement
note	Σ	0..*	Annotation

Implementation Guide on Simplifier: A variety of FHIR profiles

Using Core Data Sets, e.g. KDS, GECCO

Implementation Guide on Simplifier: A variety of FHIR profiles

Profile - Complication

Canonical: <https://www.netzwerk-universitaetsmedizin.de/fhir/StructureDefinition/complications-covid-19>

Snapshot

Element	Cardinality	Flags	Type	Binding
Condition			Condition	
modifierExtension ?!	0..*		Extension	
identifier	Σ		Identifier	
clinicalStatus	Σ ?!	S	CodeableConcept	Binding
verificationStatus	Σ ?!	S	CodeableConcept	Binding
category	1..*	S	CodeableConcept	Binding
severity	0..1		CodeableConcept	Binding
code	Σ	S	CodeableConcept	
bodySite	Σ	S	CodeableConcept	
subject	Σ	S	MII-Reference(Patient Group)	
encounter	Σ		Reference(Encounter)	
onset[x]	Σ	S	0..1	
abatement[x]			0..1	
recordedDate	Σ	S	dateTime	
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Implementation Guide on Simplifier:

A variety of FHIR profiles references numerous ValueSets with coded concepts for:

- Standardized data entry
- Mappings from proprietary data to standards
- Validation of used codes, incl. versions
- (Federated) data queries, e.g. Feasibility portal
- Data analysis on integrated data

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An arrow points from the 'Binding' column of the table to the text 'Need for terminological services!'.

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Implementation Guide on Simplifier:

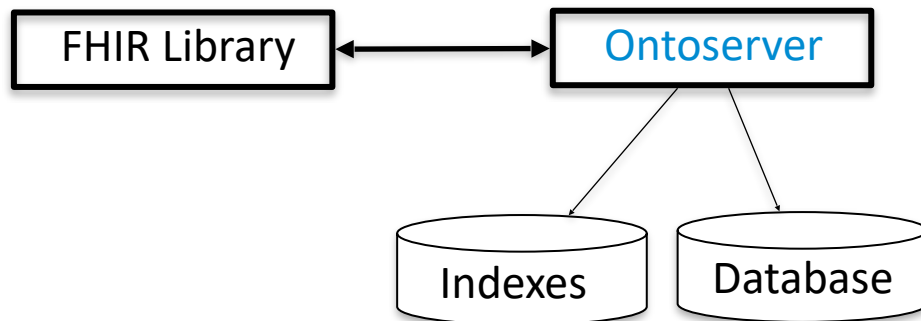
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Need for terminological services!

Need for a **FHIR-based terminology server!**

Session 1



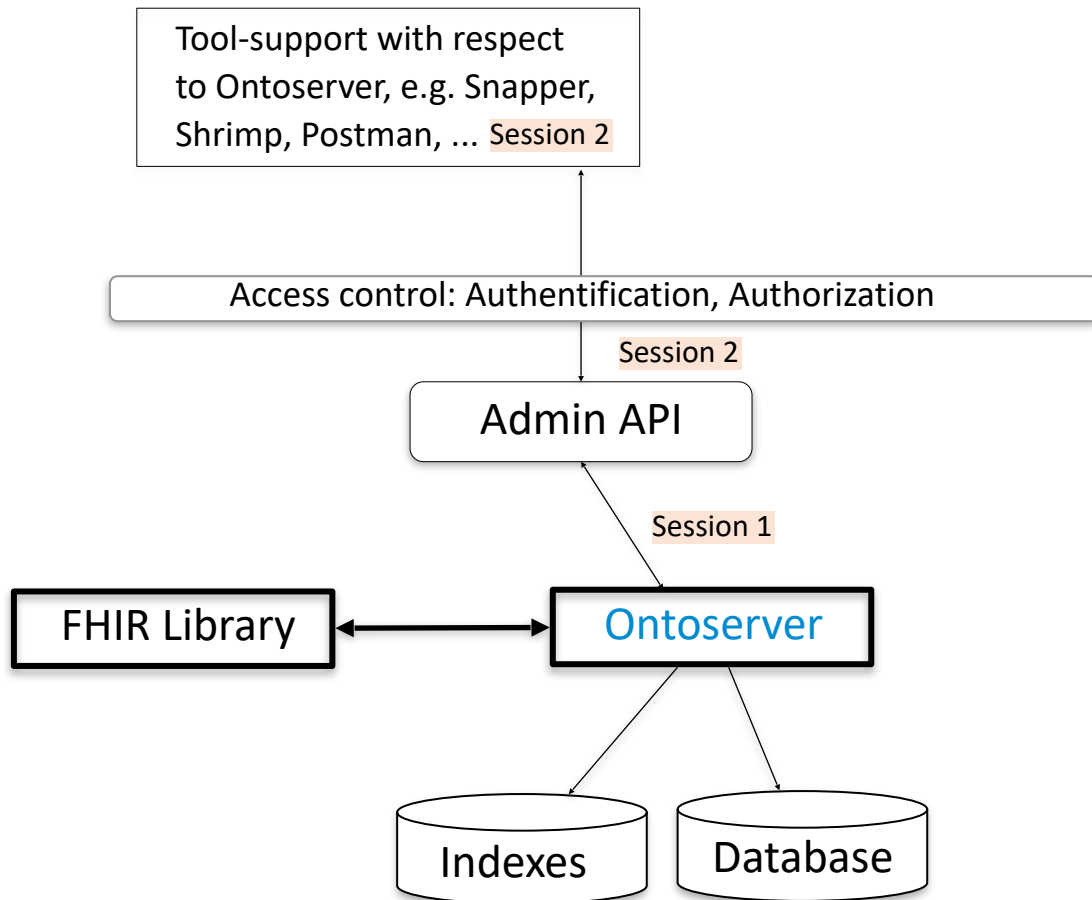
Session 1

Relevant FHIR Resources and Operations

CodeSystem	ValueSet	ConceptMap
\$lookup	\$expand	\$translate
\$validate-code	\$validate-code	\$closure
\$subsumes		
\$find-matches (Trial use)		

Metke-Jimenez A, Steel J, Hansen D, Lawley M (2018).
Ontoserver: a syndicated terminology server.
Journal of biomedical semantics 9(1):24.

see <https://ontoserver.csiro.au/>



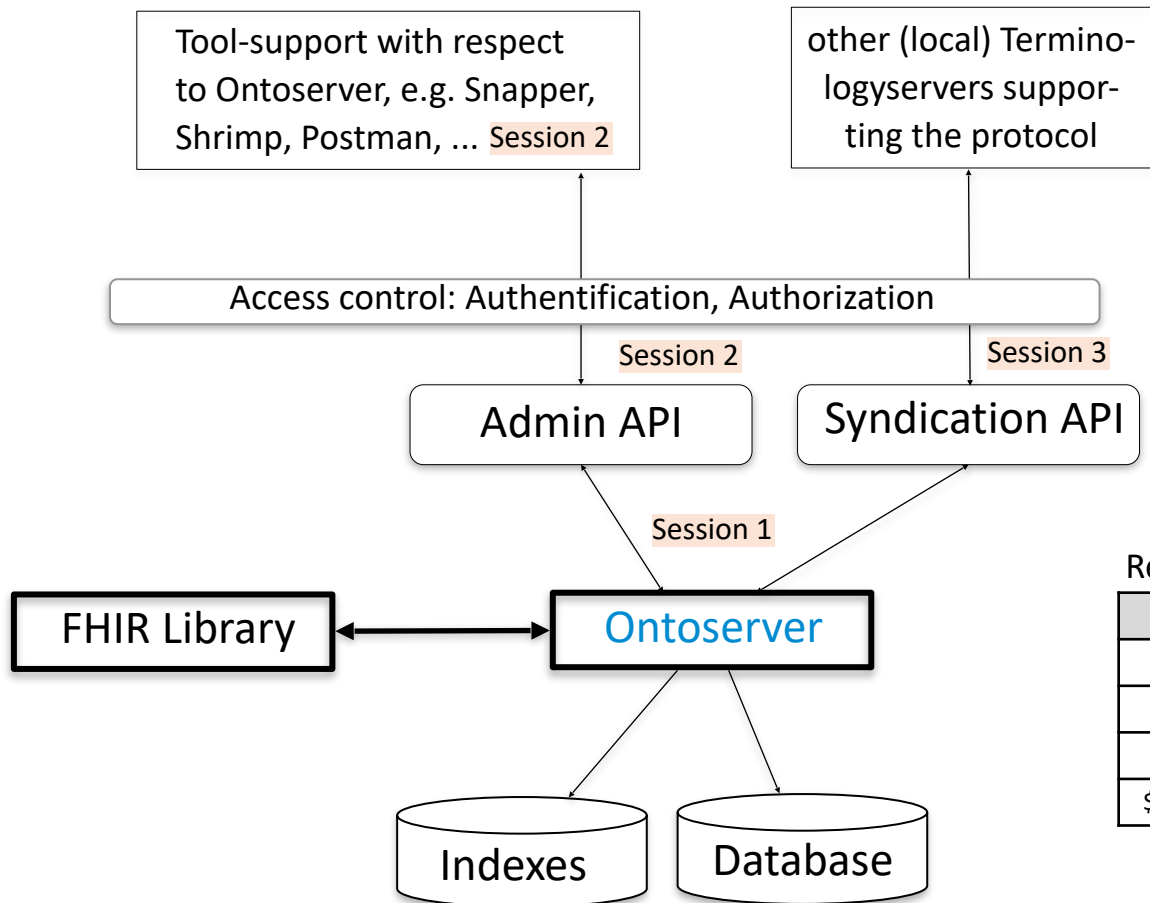
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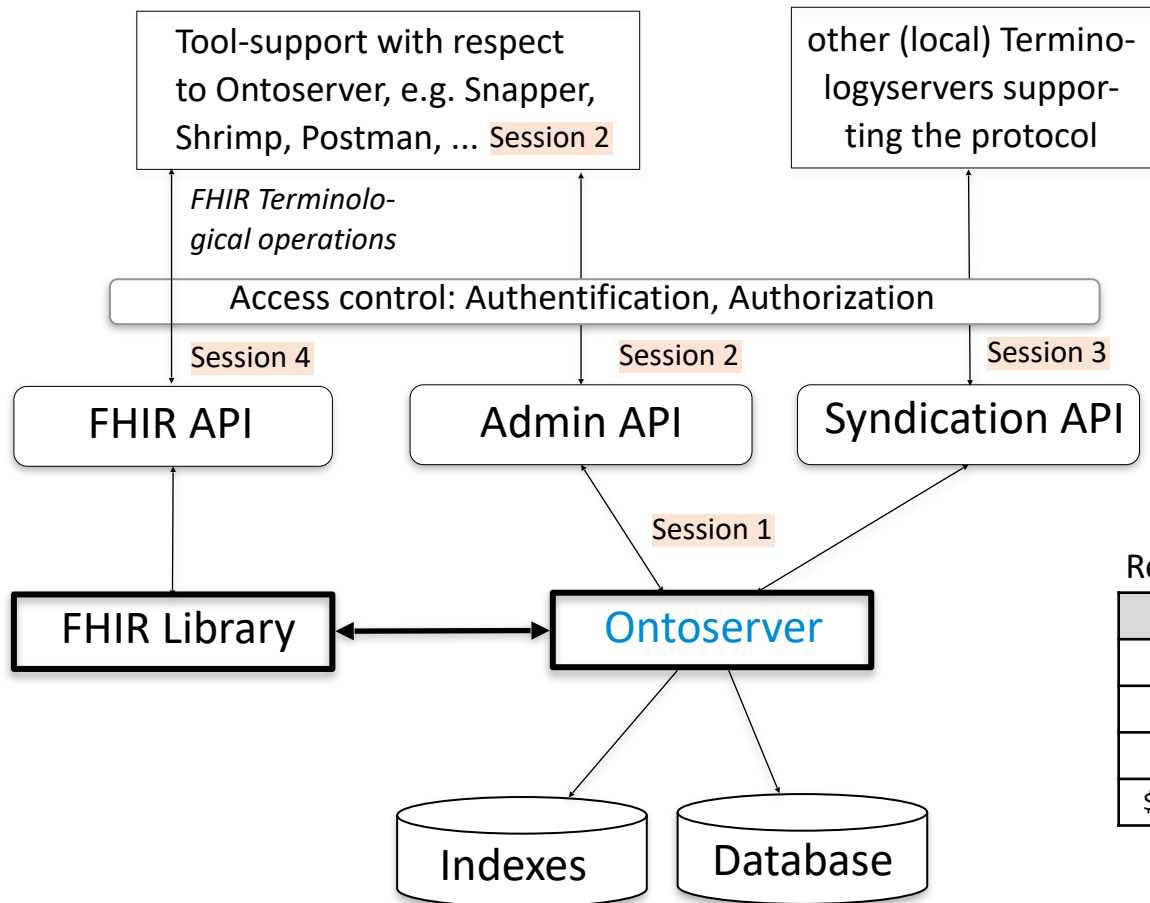
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Session 4

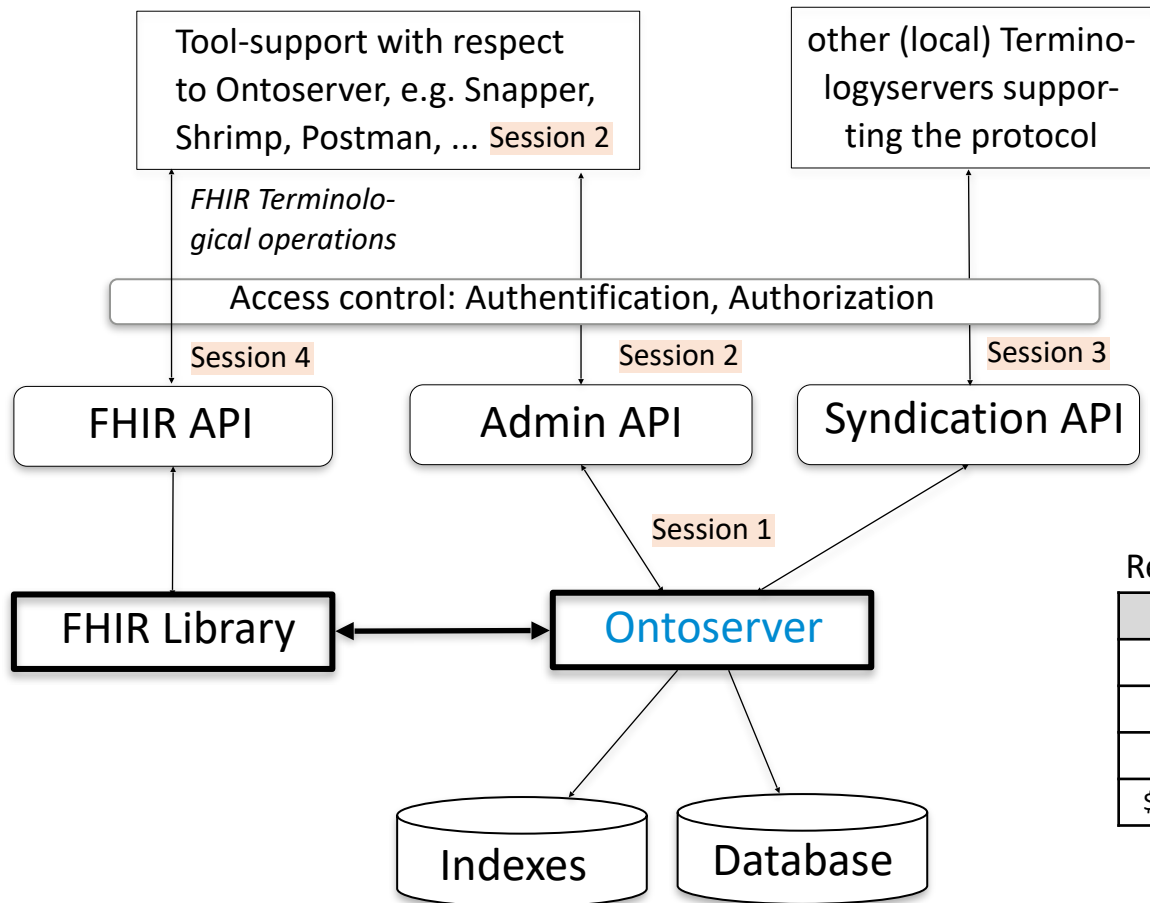
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Questions?
Session 5

Session 4

Session 1

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Program

	Welcome note – Workshop introduction Prof. Josef Ingenerf, University Lübeck
Session 1:	Introduction to Terminologies, Speaker: Lukas Emmerich (Healex):
10:00-10:30	Specific terminologies like LOINC and SNOMED CT FHIR terminology services
Session 2:	Introduction to Ontoserver, Speaker: Muhammad Adnan
10:30-11:15	How Ontoserver can be used to bring terminologies together? Ontoserver implementation in Cologne Features of Ontoserver How to use the Ontoserver?
Session 3:	Ontoserver Syndication Mechanisms, Speaker: Lukas Emmerich
11:15-11:45	Ontoserver syndication mechanisms
Session 4:	FHIR Terminology Module, Speaker: Joshua Wiedekopf
11:45-12:15	FHIR terminology Module
12:15-12:30	Module 2b: SU-TermSurv: Empowering Utilization of a Terminology Server
Session 5:	Q&A Session
12:30-13:00	Open discussion



Module 2b project „SU-TermServ“



In the third and last phase of the Medical Informatics Initiative (MII) and next to central funding for DICs, NUM-RDP, Module 3 projects (*clinical and methodological*) there are infrastructural Modul 2b projects like SU-TermServ, FDPG-PLUS, etc.

Module 2b project „SU-TermServ“



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The Service Unit „Terminological Services“ (SU-TermServ) can build on the central Ontoserver in Cologne, that started work already in MII-phase 2 within HiGHmed. In phase 3 new licence contracts with CSIRO allows access to all MII- & NUM-sites.



Module 2b project „SU-TermServ“

Small project with partners from Cologne, Hanover and Lübeck,
see <https://mii-termserv.de/>.

Tasks / Milestones:

M 1: Provide terminological content and services (06/23)

“Central Ontoserver in Cologne with the “source of truth” for MII & NUM

M 2: Status of alternative TS infrastructures recorded (12/23)

“Terminologyserver-Challenge” in Sept. 2023, GMDS Heilbronn ([LINK](#))

M 3: Support for IT solutions, esp. for local requirements, available (09/24)

M 4: Concept for distribution services, integration test environment (09/25)



Collaboration, related activities

- MII-Working Group „Interoperability“, Taskforce „Terminological Services“: exchange of needs at MII- & NUM-sites (also in MII-NUM_DIZ-meetings)

Examples of suggested services from participants:

- Validation tool for adhering to naming conventions before uploading terminological resources to central TS.
- Mappings between annual versions of classifications such as ICD-10-GM, OPS and ATC for cross-version data evaluations (ConceptMaps)
- ...



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- Awareness on the national level (gematik), e.g. Interop Council - Working group „Requirements for a national terminology server“ ([LINK](#))



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AND: adaption of §355 SGB V (section 12 and 13)

(12) Die Gesellschaft für Telematik errichtet und betreibt eine Plattform, auf der medizinische Klassifikationen, Terminologien, Nomenklaturen und weitere semantische Standards für das deutsche Gesundheitswesen bereitgestellt und von Nutzern in geeigneter Form abgerufen werden können (**Terminologieserver**). Der **Terminologieserver** dient insbesondere der zentralen Bereitstellung sowie der Versionierung.

(13) Das Bundesinstitut für Arzneimittel und Medizinprodukte koordiniert die Bereitstellung, Pflege und Fortschreibung der medizinischen Klassifikationen, Terminologien, Nomenklaturen und weiteren semantischen Standards auf dem **Terminologieserver** und stimmt diese im Rahmen des in Absatz 7 genannten nationalen Kompetenzzentrums für medizinische Terminologien mit den Nutzern des **Terminologieservers** sowie der Koordinierungsstelle für Interoperabilität im Gesundheitswesen nach § 3 Absatz 1 der IOP-Governance-Verordnung ab.

Cascading Terminology Servers (Vision)

Terminology Server

(Germany)

z.B. official Classifications (*ICD-10, OPS*)
und Terminologies (*LOINC, Alpha-ID, ...*)

Terminology Server

(Governmental
Activities)

z.B. *MIOs, ISiK, ...*

Terminology Server

(Research context)

z.B. *KDS, GECCO, ...*

*Medical Informatics Initiative (MII) and
Network of University Medicine (NUM)
cooperate in infrastructure issues.*

Terminology Server

(DiFUTURE)

z.B. *Use Case – relevant
Terminologies, ...*

Terminology Server

(HiGHmed)

z.B. *Use Case – relevant
Terminologies, ...*

Terminology Server

(MIRACUM)

z.B. *Use Case – relevant
Terminologies, ...*

Terminology Server

(SMITH)

z.B. *Use Case – relevant
Terminologies, ...*

**Further
Usages**

Terminology
Server
(Site 1)

e.g. + local
Terminologies, ...

Terminology
Server
(Site n)

e.g. + local
Terminologies, ...

Terminology
Server
(Site 1)

e.g. + local
Terminologies, ...

Terminology
Server
(Site n)

e.g. + local
Terminologies, ...

Terminology
Server
(Site 1)

e.g. + local
Terminologies, ...

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e.g. + local
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Terminology
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Questions?

Result of the small survey at the registration

Number of registered persons: **38**

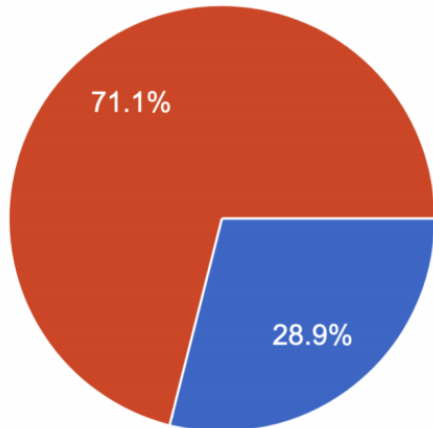
1. Do you run a terminology server instance locally in your institute? - **11** (yes)
2. Have you used the MII Central Terminology server (in Cologne) so far? - **6** (yes)

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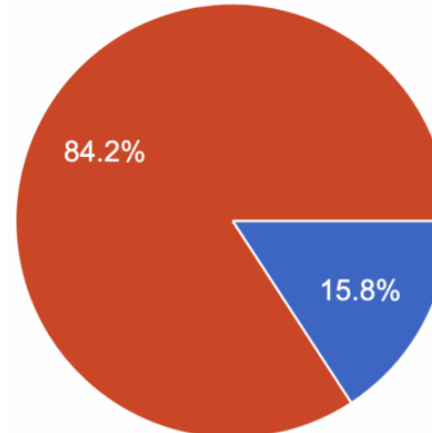
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1. Local use of TS



2. Use of central TS





Some further issues

Relevance of SNOMED CT

=> at input- or specification level: SNOMED CT (incl. PCEs) is used

=> at output- or data analytics level (e.g. FDPG portal): no SCT-codes available



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Demand for terminological services at local sites

a) using a local Ontoserver instance linked to the central Ontoserver by syndication

b) alternative solutions:

=> **Expanding of** (intensional defined) **ValueSets** can be provided by the central Ontoserver

=> **Validation of codes** in FHIR resources: an offline CodeValidation-Tool will be provided (similar to the Data Quality Test Tool of the FDPG-project)

=> ConceptMaps for **mapping proprietary codes** to standard codes (e.g. LOINC) will not be executed by using the central Ontoserver