FIZ Karlsruhe

Leibniz Institute for Information Infrastructure

Patents4Science
- Bringing Patent Knowledge to Science

H. Aras, FIZ Karlsruhe   **18.05.2022**

AGENDA

- Survey and Needs Analysis
  - Results & Challenges
- Patents4Science – Project Idea
- Funded DFG-Project: Scope, Timeline and Goals
- System Architecture / Conceptual View
  - Work Packages & Tasks
- Semantic Modeling of Patent Data
  - Examples

Patents4Science – Survey at several Leibniz Research Institutes

- What knowledge about and what need for patent information to support research exists among scientists?

  – First, online survey at Leibniz institutes: INP, LIKAT, INM, IPHT, ISAS

- Evaluations confirm the assumption that in certain areas patents are an essential source of information in scientific research.

Survey on Patents and Scientific Information in Research and Development

I. General Information

* 1. **What is your position?**
  - ( ) (Junior) Group Leader (Gruppen- oder Abteilungsleiter*in)
  - ( ) Programme Manager (FB- oder FS-Leiter*in)
  - ( ) Scientist
  - ( ) Technician
  - ( ) Administration
  - ( ) Other:

2. **Which age group do you belong to?**
  - ( ) < 35
  - ( ) 35-50
  - ( ) > 50

* 3. **What are your main research topics?**
  - [ ] Materials and Surfaces
  - [ ] Plasma Chemical Processes

- Patents are used as a source of information alongside scientific literature and research data.

- Access to and use of patent information is often considered difficult.

- Linking of scientific literature and specific information in patents (e.g. technical specifications, chemical entities) is required.

- Scientists are interested in relevant knowledge from patents, e.g. solutions, methods, etc.

- There is interest in technology analysis using patents in combination with scientific literature.

- Open access and free sources are preferred.

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- Making the relevant knowledge in patents accessible employing machine learning and semantic technologies

- Provision of a (freely) accessible and linked data platform for accessing patent information

- Easy and efficient Integration into (existing) information infrastructures (APIs)

- (Sustainable) financing

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Patents4science - Project Idea

- Building an information infrastructure for exploiting patent information in scientific contexts, e.g. research labs (submitted to DFG)

  – Builds on existing patent data infrastructure

- Aims to create a Patent Knowledge Graph (PKG) by utilizing semantic enrichment & entity inking.

  – Semantic integration of patent information with scientific literature and *domain-specific resources* based on explicit (machine-understandable) semantics

  – Extending and linking existing knowledge graphs, exploiting explicit semantic models

  – Applying ml/dl, nlp and lod technologies e.g. for (entity) mention detection

- Semantic search and analysis applications that benefit from the patent knowledge graph

DFG Project „Patents4Science"

Funding programme:	DFG - LIS / e- Research Technologies
Project number:	496963457
Project timeline:	**01.06.2022** - 31.05.2025
Partners:	FIZ Karlsruhe, INP (Greifswald), IWT (Bremen), INM (Saarbrücken)
Budget:	approx. 900.000 EUR
End report due:	01.05.2025 (see DFG-Template 12.02)

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Joint project funded by the German Research Foundation (DFG) with partners

- FIZ Karlsruhe – Leibniz Institute for Information Infrastructure (FIZ KA)

- Leibniz Institute for Plasma Science and Technology (INP)

- Leibniz Institute for Materials-oriented Technologies (IWT)

- Leibniz Institute for New Materials (INM)

System Architecture / Conceptual View
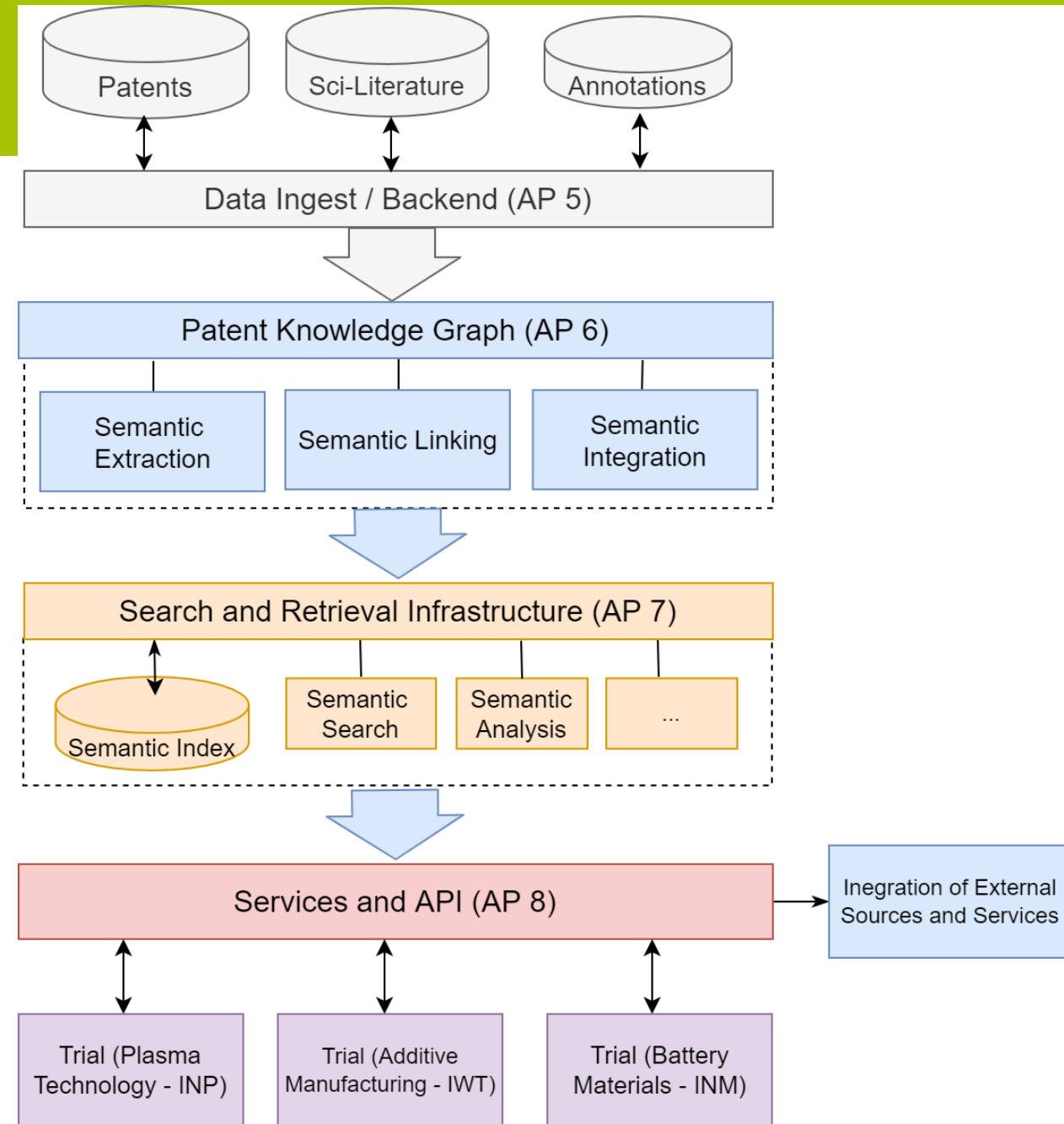
Core Components:

- P4S Data Backend
- Patent Knowledge Graph
- Services and APIs
  - Semantic Search / Retrieval
  - Querying the KG
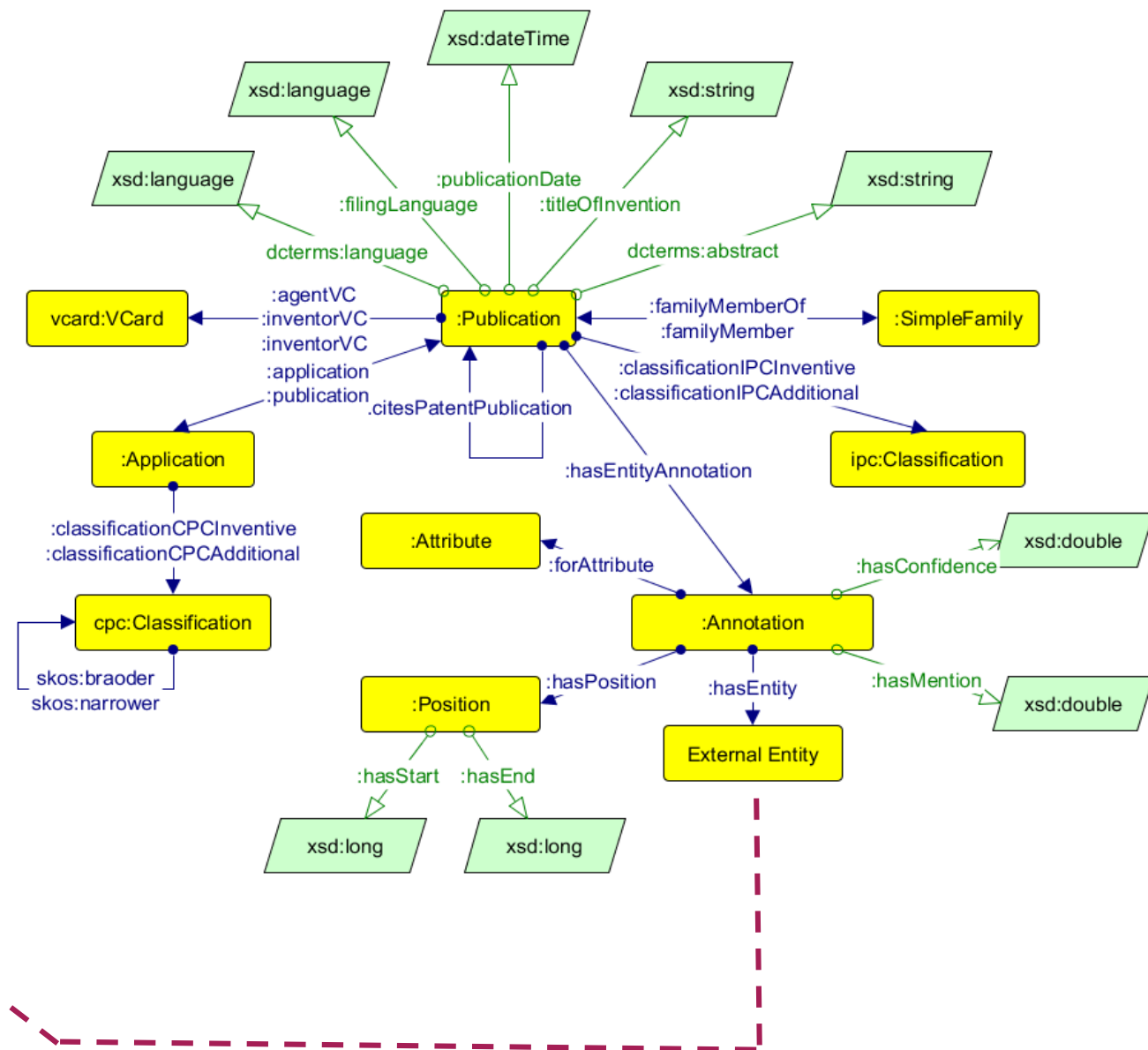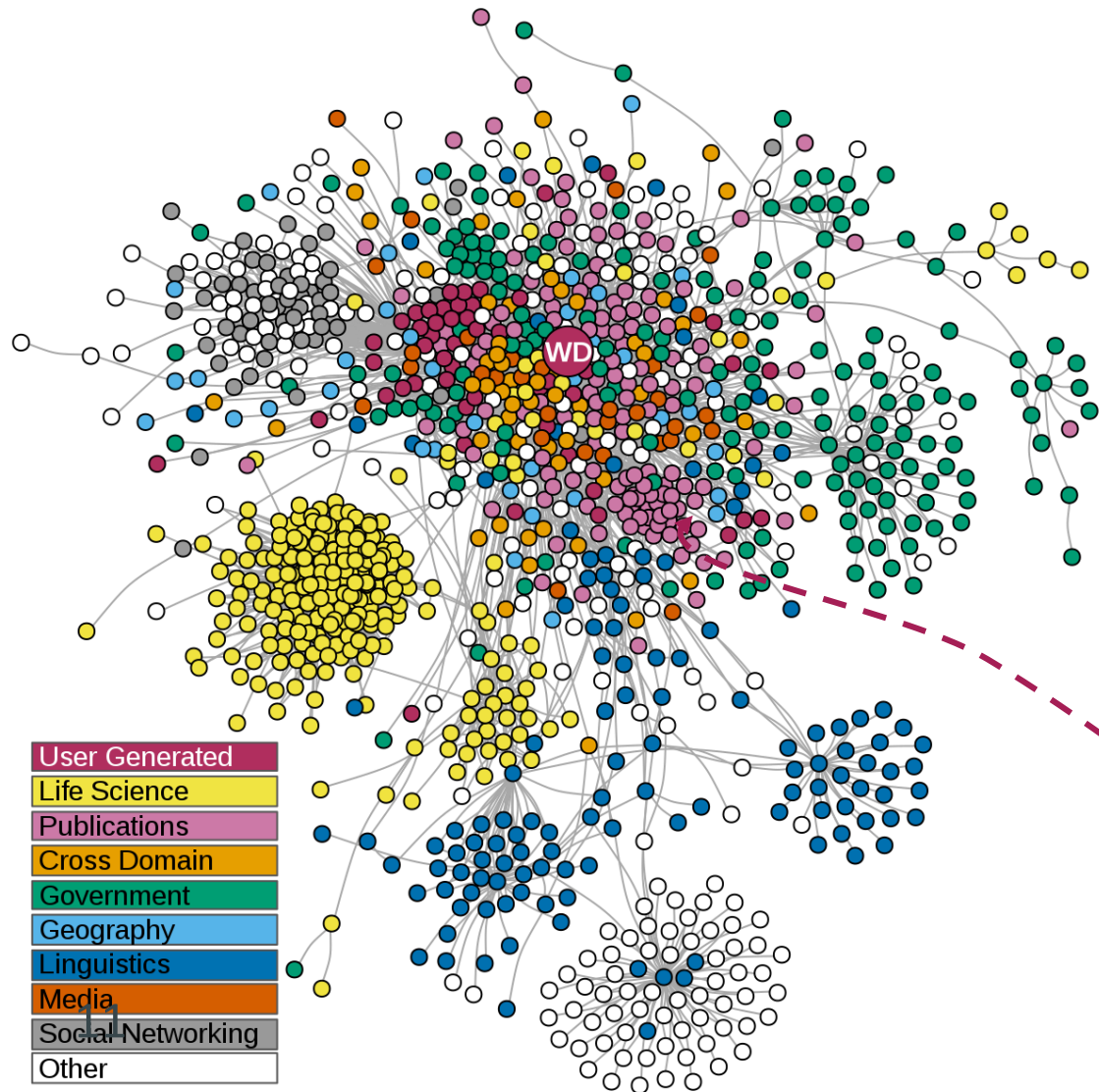 - Answer / Results Fusion
  - P4S-Client

9
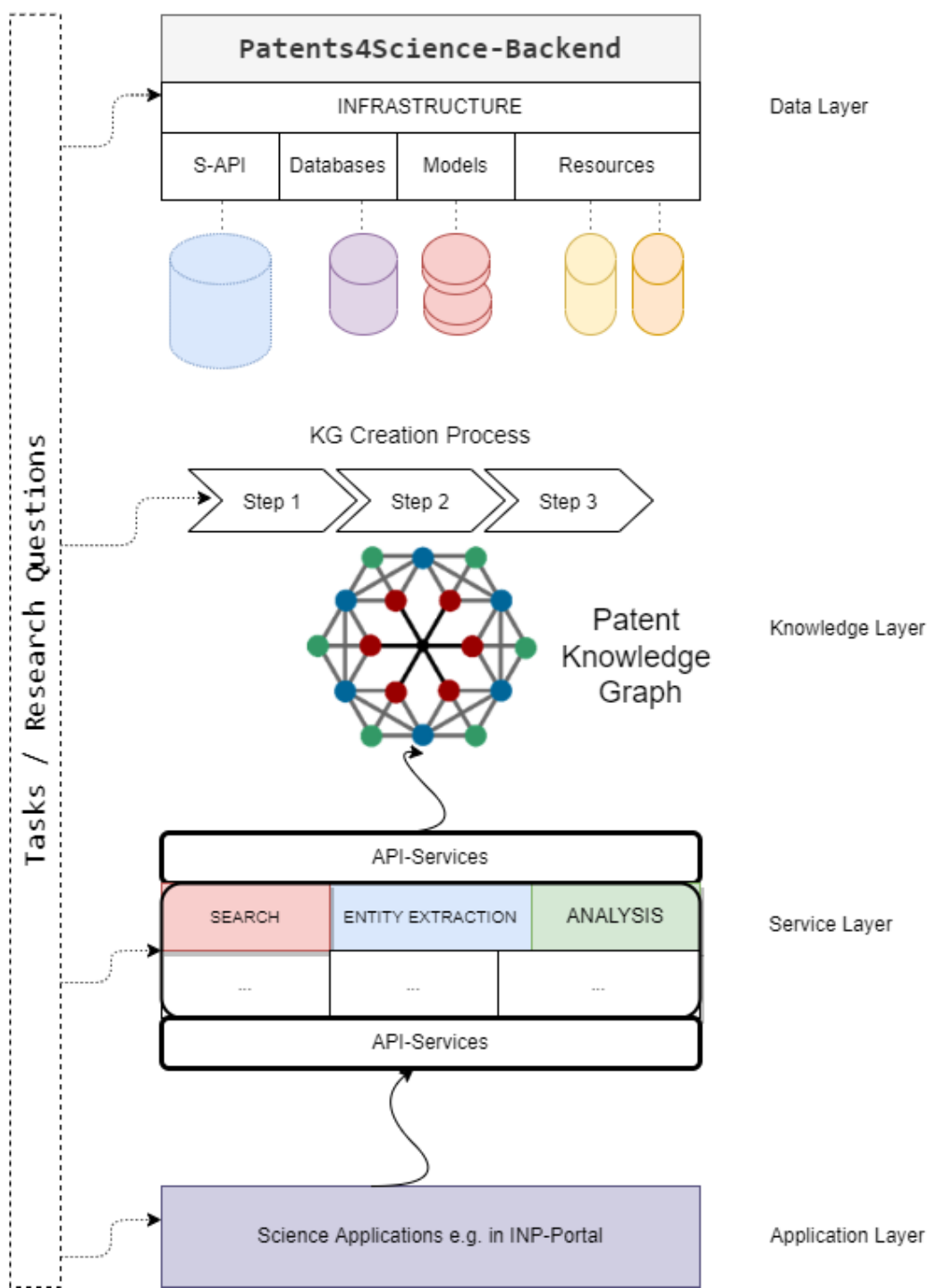
Work packages in Patents4Science:

- WP1: Project Management

- WP2: Expert / User Group

- WP3: Requirement Analysis

- WP4: System Architecture

- AP5: Data Ingest / Backend

- AP6: Patent Knowledge Graph

- AP7: Search Infrastructure

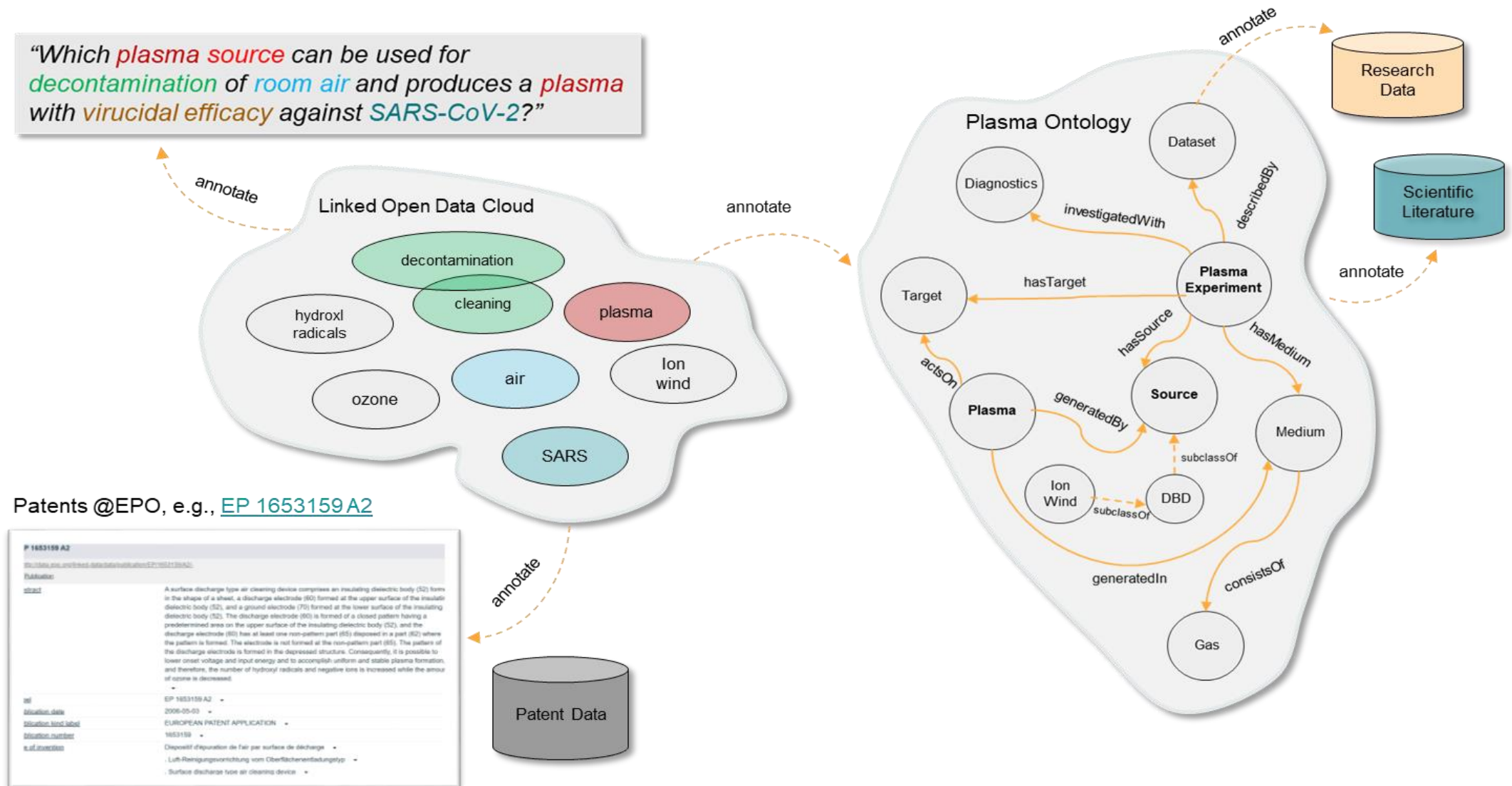- AP8: Services and APIs

- AP9: User Trials

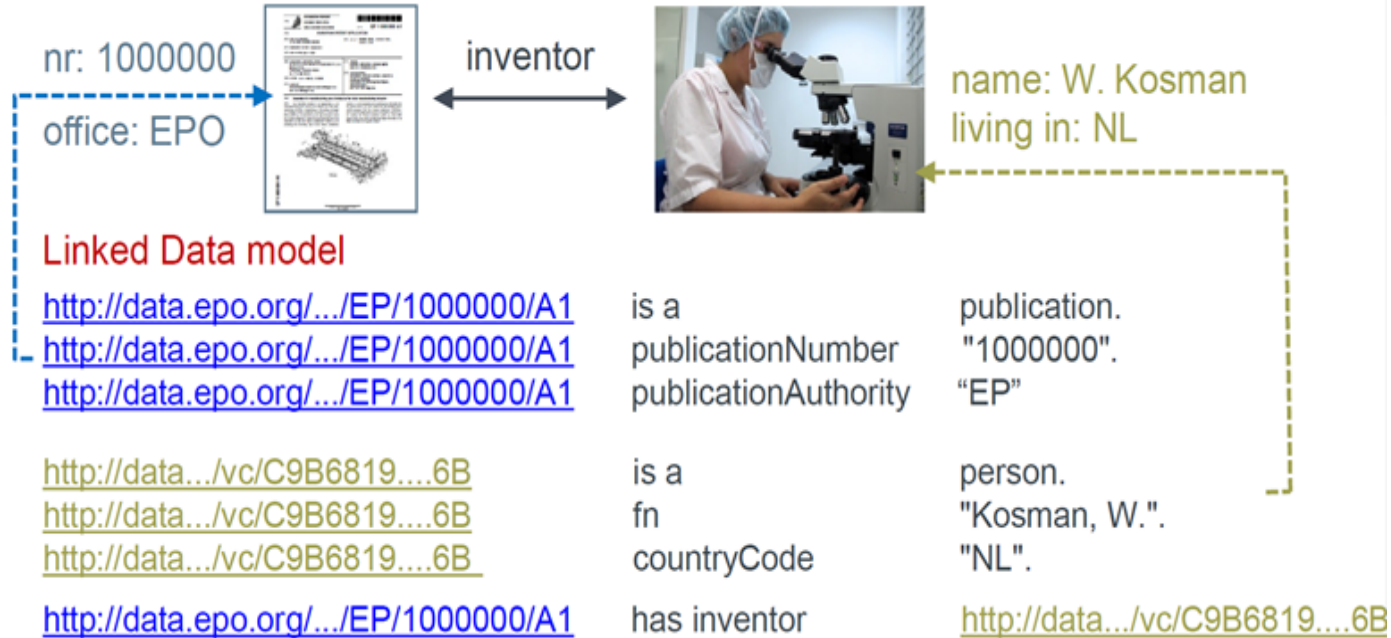# Semantic Encoding of Patents / Linked Open Patent Data

Legend:
- User Generated
- Life Science
- Publications
- Cross Domain
- Government
- Geography
- Linguistics
- Media
- Social Networking
- Other

Diagram labels:

xsd:dateTime
xsd:language
xsd:string
xsd:language
xsd:string

:publicationDate
:filingLanguage
:titleOfInvention
dcterms:language
dcterms:abstract

vcard:VCard
:agentVC
:inventorVC
:inventorVC
:application
:publication
:Publication
:familyMemberOf
:familyMember
:SimpleFamily

:citesPatentPublication
:classificationIPCInventive
:classificationIPCAdditional
ipc:Classification

:Application
:classificationCPCInventive
:classificationCPCAdditional
cpc:Classification
skos:braoder
skos:narrower

:hasEntityAnnotation

:Attribute
:forAttribute
:Annotation
:hasConfidence
xsd:double

:hasPosition
:hasEntity
:hasMention
xsd:double

:Position
:hasStart
:hasEnd
xsd:long
xsd:long

External Entity

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nr: 1000000
office: EPO
inventor
name: W. Kosman
living in: NL

Linked Data model
http://data.epo.org/.../EP/1000000/A1
http://data.epo.org/.../EP/1000000/A1
http://data.epo.org/.../EP/1000000/A1

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http://data.../vc/C9B6819....6B

http://data.epo.org/.../EP/1000000/A1

is a	publication.	
publicationNumber	"1000000".	
publicationAuthority	"EP"	
is a	person.	
fn	"Kosman, W.".	
countryCode	"NL".	
has inventor	http://data.../vc/C9B6819....6B	

"plasma" ->
http://dbpedia.org/resource/Plasma_(physics)
https://www.wikidata.org/wiki/Q10251
"electrode" ->
http://dbpedia.org/resource/Electrode
https://www.wikidata.org/wiki/Q176140
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http://dbpedia.org/resource/Cleaning
https://www.wikidata.org/wiki/Q17200001
"air" ->
http://dbpedia.org/resource/Atmosphere_of_Earth
https://www.wikidata.org/wiki/Q3230

THANK YOU!

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