

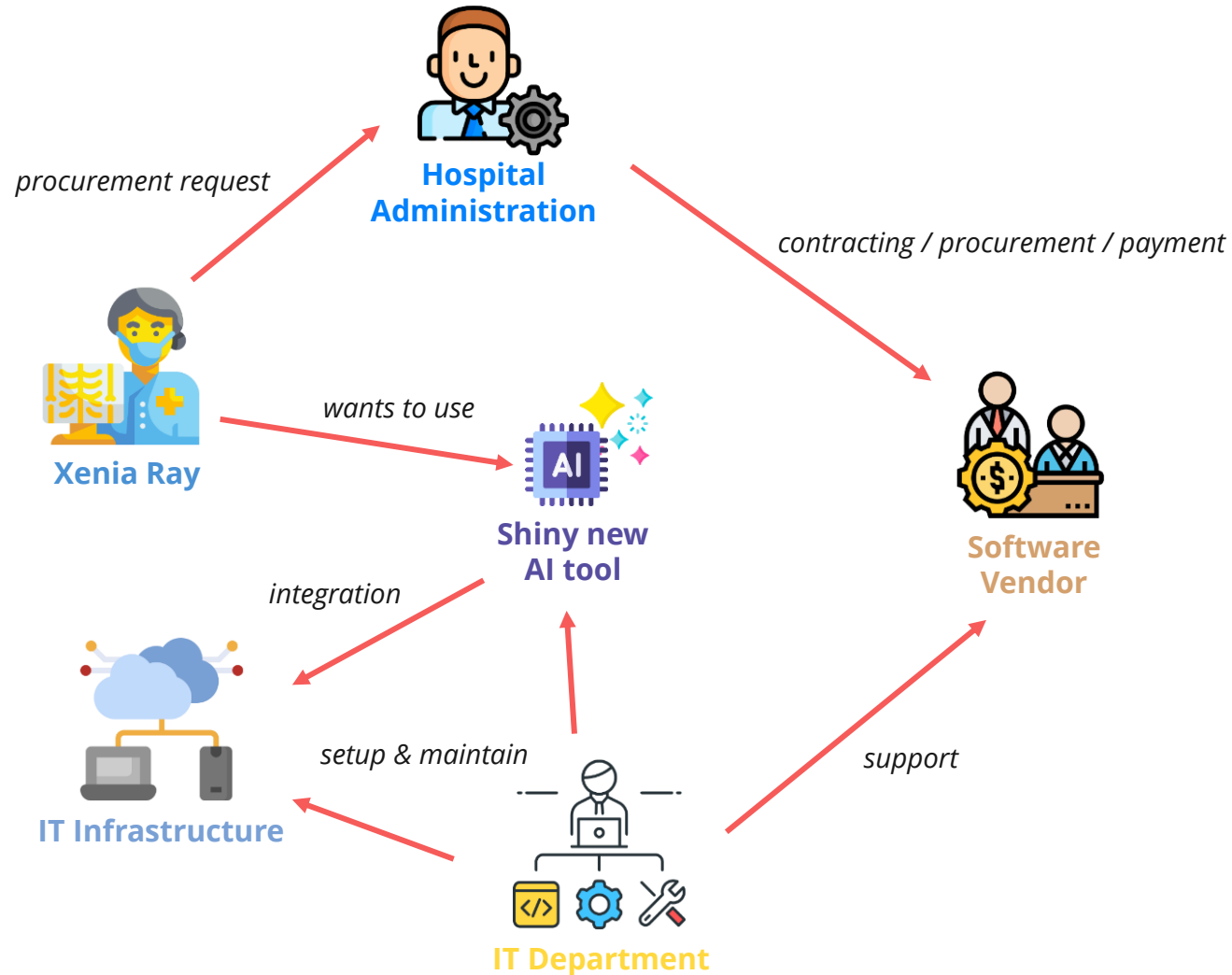


OMI: Open Medical Inference Methods platform

A short overview



What happens when Xenia wants that tool..





**What happens when Xenia
wants 500 of such tools?!**



Rationale



- Use of AI in healthcare will likely skyrocket (>500 FDA cleared apps available)
- Deployment of numerous AI services poses challenges to IT infrastructure and administration, leading to operational issues and high costs for rare AI models
- Solution: AI platforms (aka Marketplaces aka App Stores)
- Winner-take-all markets: Proprietary AI platforms in a fragmented market will lead to monopolies or oligopolies
- To prevent monopolistic dominance, **transparent and neutral rules for participation**, including **open communication and data formats**, are essential



Context



- AI relies on data, but its effectiveness is limited by the availability of **semantically interoperable data**, foundational work has been done by the MII to establish standards and data availability
- Multimodal data enhances AI capabilities, sooner or later, almost all models will work with **multimodal inputs**
- **DICOM** is versatile and **complements FHIR** data, supporting not just medical imaging but also other data types like waveforms, making it ideal for complex data exchange
- AI analysis produces valuable, often quantitative, data that should be **stored and shared in interoperable formats**



Overall Objectives



- Specification of **open protocols and data formats** for semantically interoperable peer-to-peer exchange of image-based multimodal healthcare data between DIC and AI service providers
- **Extension the MII Core Data Set** to include medical imaging in terms of the FHIR description of medical image datasets, workflow related metadata and AI derived data (e.g. structured reports)
- **Build on existing** specification, implementation and infrastructure (e.g. HiGHmed DSF)
- Specification and publication of an **AI Governance and Ethics Framework** for the use of AI in healthcare



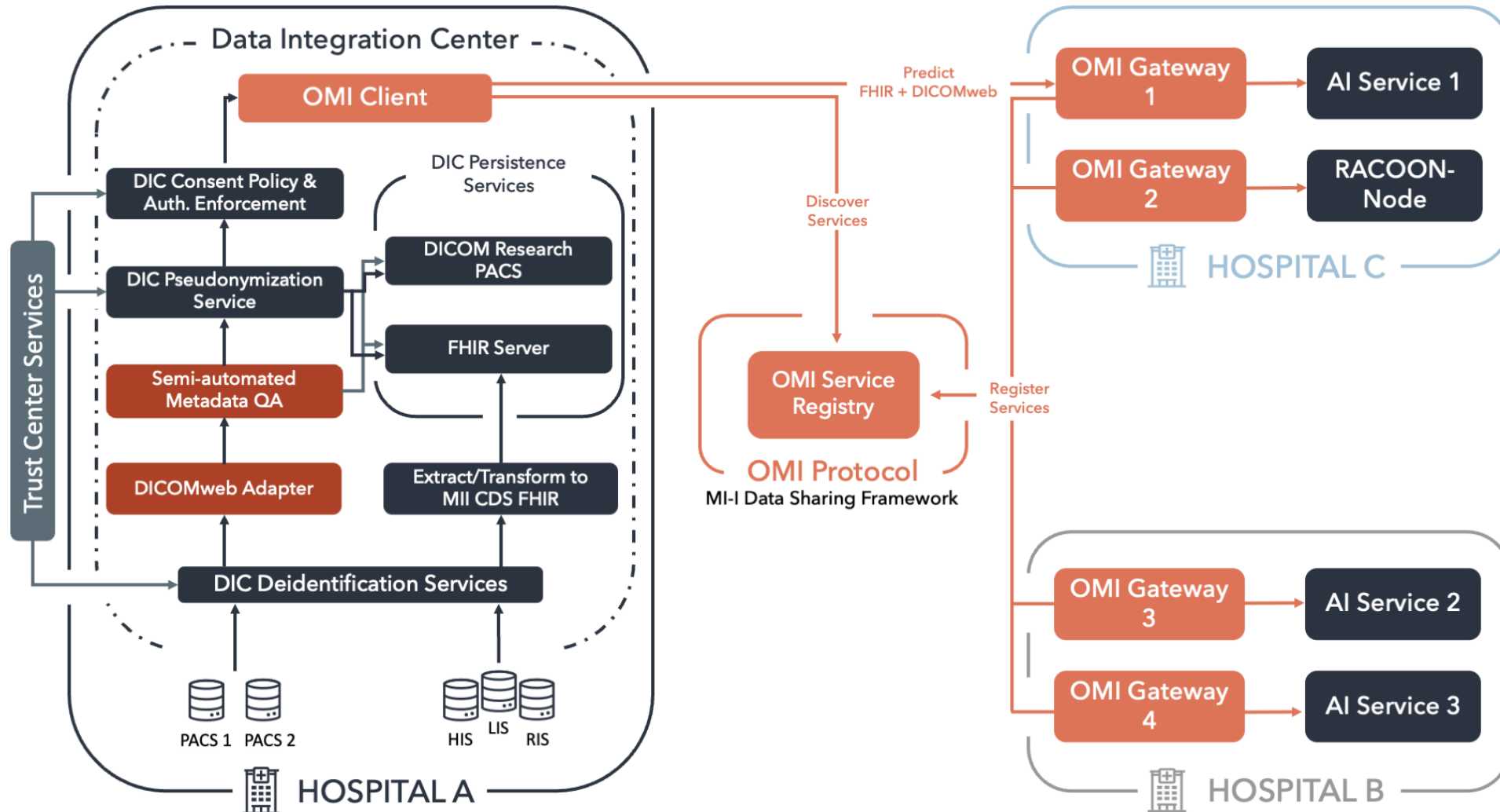
Overall Objectives



- **Reference implementation** of infrastructure components for the OMI protocol:
 - OMI client with full DIC integration (incl. a DICOMweb™ adapter)
 - OMI gateway component
 - OMI service registry
- Rollout of these components to OMI partners and **demonstration of the technical feasibility** of remote AI inference in the OMI network
- The **connection of the NUM-RACOON nodes** to the DIC infrastructure as local and remote AI service providers
- **Collaboration** with other partners within and outside the MII, and the involvement of other key stakeholders from research and clinical care (e.g. medical societies, industry, gematik)



OMI in a diagram





Workpackages



1. Specification of the Open Medical Inference Protocol (**MOLIT**, TUM, UKF, UKFr, UKK, UKEr, UKHD, HHN, UME, UMR)
2. Specification of (imaging) extensions of the MII CDS (**UKEr**, UME, UKHD, UKF, UKFr, UKK, MHH, UKW, MOLIT, HHN)
3. Implementation of the DICOMweb™ adapter (**UME**, MHH, CHA)
4. Implementation of the OMI Gateway Server (**UME**, UKFr, UMR, UKF, MOLIT, UKHD, HHN, CHA)
5. Implementation of the OMI (DIC) Client (**UKB**, **TUM**, UME, UKU, UKFr, UKK, UKF, MHH, MOLIT, UKEr, HHN, UMR, UKW, CHA)
6. Implementation of the OMI Service Registry (**TUM**, UKEr)
7. AI Governance and Ethics Framework (**UKEr**, UME, UKK, UKFr)
8. Roll-out and Evaluation (**TUM**, UKB, UME, UMR, UKU, UKF, UKFr, UKD, MHH, UKK, UKW, UKHD, UKEr, CHA)
9. Project Management (**UME**)



Misconceptions: What we are and aren't



- A specification of open standards that describes the exchange of information in a distributed network of providers and users of medical inference services ✓
- A reference implementation of this specification ✓
- A commercial AI marketplace ✗
- A development project of new AI tools ✗
- The MII version of NUM RACOON ✗
- A clinical evaluation of AI tools ✗
- A sinister plan of the reptilians to seize world domination ✗



Structure of the Network (Partners)



Partner	Initiatives	Role
University Medical Center Essen	SMITH, RACOON	Coordinator
Technical University Munich	DiFUTURE, RACOON	Co-Coordinator
University Hospital Erlangen	MIRACUM, RACOON	Co-Coordinator
Charité University Medicine Berlin	HiGHmed, RACOON	Partner WP3, WP4, WP5, WP8
University Hospital Bonn	SMITH, RACOON	Partner WP5, WP8
University Hospital of Cologne	HiGHmed, RACOON	Partner WP1, WP2, WP5, WP7, WP8
University Hospital Freiburg	MIRACUM, RACOON	Partner WP1, WP2, WP4, WP5, WP7, WP8
University Hospital Frankfurt	MIRACUM, RACOON	Partner WP1, WP2, WP4, WP5, WP8
Hannover Medical School	HiGHmed, RACOON	Partner WP2, WP3, WP5, WP8
MOLIT Institute Heilbronn	HiGHmed (assoc.)	Partner WP1, WP2, WP4, WP5
University Hospital of Würzburg	HiGHmed, RACOON	Partner WP2, WP5, WP8
University Medical Center Rostock	SMITH, RACOON	Partner WP1, WP4, WP5, WP8
University Hospital Heidelberg	HiGHmed, RACOON	Partner WP1, WP2, WP4, WP8
University Hospital Ulm	DiFUTURE, RACOON	Partner WP5, WP8
University Hospital of Düsseldorf	SMITH, RACOON	Partner WP8
University of Applied Sciences Heilbronn	HiGHmed	Partner WP1, WP2, WP4, WP5



Structure of the Network (Assoc. Partners)



Partner	Role
German radiological society	Coordination with regard to the activities of the German Radiological Society, e.g. Imaging related MIOs, standardized terminology RadLex Playbook
German Society for Nuclear Medicine	Coordination with regard to the activities of the German Society for Nuclear Medicine
European Society of Medical Imaging Informatics	Dissemination of results on European level, including European Society of Radiology and advocating in various forums, e.g. DICOM, IHE, etc.
RACOON: Radiological Cooperative Network	Bridging to the RACOON NODEs as AI service providers. Coordination with regard to interoperability with RACOON data models and interfaces.
Gematik GmbH	Ensure interoperability with gematik projects
National Research Data Infrastructure for Digital Pathology	Coordination with regard to the activities of NFDI4Patho
Fit4translation (MII)	Consulting with regard to the Medical Device Regulation
PrivateAIM (MII)	Privacy-preserving machine learning
Nvidia Corporation	Interoperability with open-source inference serving software, e.g. NVIDIA Triton Inference Server
Siemens Healthineers	Inclusion of a commercial vendor of AI solutions in the specification to ensure compatibility with a future commercial use
Planet Artificial Intelligence GmbH Rostock	Inclusion of a commercial vendor of AI solutions in the specification to ensure compatibility with a future commercial use; WP8 AI service: IRA Spine
Deepshore GmbH	Technical rollout partner



Thank you for your attention

