OpenDreamKit Work Package 6

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A math VRE where systems share Data ($D$), Knowledge ($K$), and Software ($S$).
WP6 Objectives

- A VRE needs an infrastructure that supports the creation, management, access, and dissemination of \(DKS\)-Structures. (\(D\triangleq\) Data/\(K\triangleq\) Knowledge/\(S\triangleq\) Software)

- **Observation:** All ODK systems (GAP, SAGE, PARI, SINGULAR, OEIS, arXiv.org, . . . ) already include data, knowledge, and software modules.

- **Limitation:** low system Interoperability (Not a VRE yet)

- **Root Cause:** systems share the math, but represent \(DKS\) differently.

- **WP6 Objectives:**
  1) design metadata and representation formats for trans-system \(DKS\) structures as a basis for a math VRE,
  2) implement interfaces to existing systems for interoperability and compatibility with the RE, and
  3) implement a joint \(DKS\) infrastructure for, searches, documentation, traceability, versioning, provenance, visualisation and native dissemination of OpenDreamKit results (the latter three together with WP4).
WP6: Approach, Coverage

➤ **WP6 Goal:** Build a $\mathcal{DKS}$ repn. format, implement as a joint $\mathcal{DKS}$-base

➤ **WP6 Approach:** Build on a modular, foundation-independent, web-scalable $\mathcal{DKS}$-format/base $\sim$ OKDML/ODKBase

1) for $K$ use OMDoc/MMT as a basis *(established interoperability format/base)*
2) for $S$ extend it by computational foundations *(prototype for Scala exists)*
3) for $D$ develop scalable $K\mathcal{S}$-compatible data adaptors. *(theory: $K \supseteq D \wedge S \supseteq D$)*

Based on this make OpenDreamKit system/databases interoperable

1) export existing databases into ODKML,
2) specify ODK system foundations in ODKML
3) build OKDML import/export facilities for ODK systems
4) connect all up via ODKBase *(acting as a $\mathcal{DKS}$ server and semantic context)*

➤ **Coverage:** Start small/deep, extend, iterate *(Mexican hat profile)*
WP6 Participants/Efforts

Sites involved in WP6: Data/Knowledge/Software-Bases

1) JacobsUni (46 PM; lead) Survey, ODKML design, ODKBase implementation, OEIS, LMFDB, FindStat, Python/Sage Foundations, Search/query
2) UPSud (37 PM), ODKbase design, CAS Integration, Python/Sage Foundations
3) USTAN (10 PM), Survey, ODKbase design, Python/Sage Foundations, CAS Integration
4) UWarwick (25 PM) LMFDB, ODKbase design, CAS Integration
5) UZH (12 PM) Survey, ODKML design, LMFDB, FindStat, Python/Sage Foundations
6) Logilab (2PM) ODKbase design
7) USlaski (?? PM) CAS Integration, ODKBase design

Total Effort: 132 PM

(≈ 11 person years)