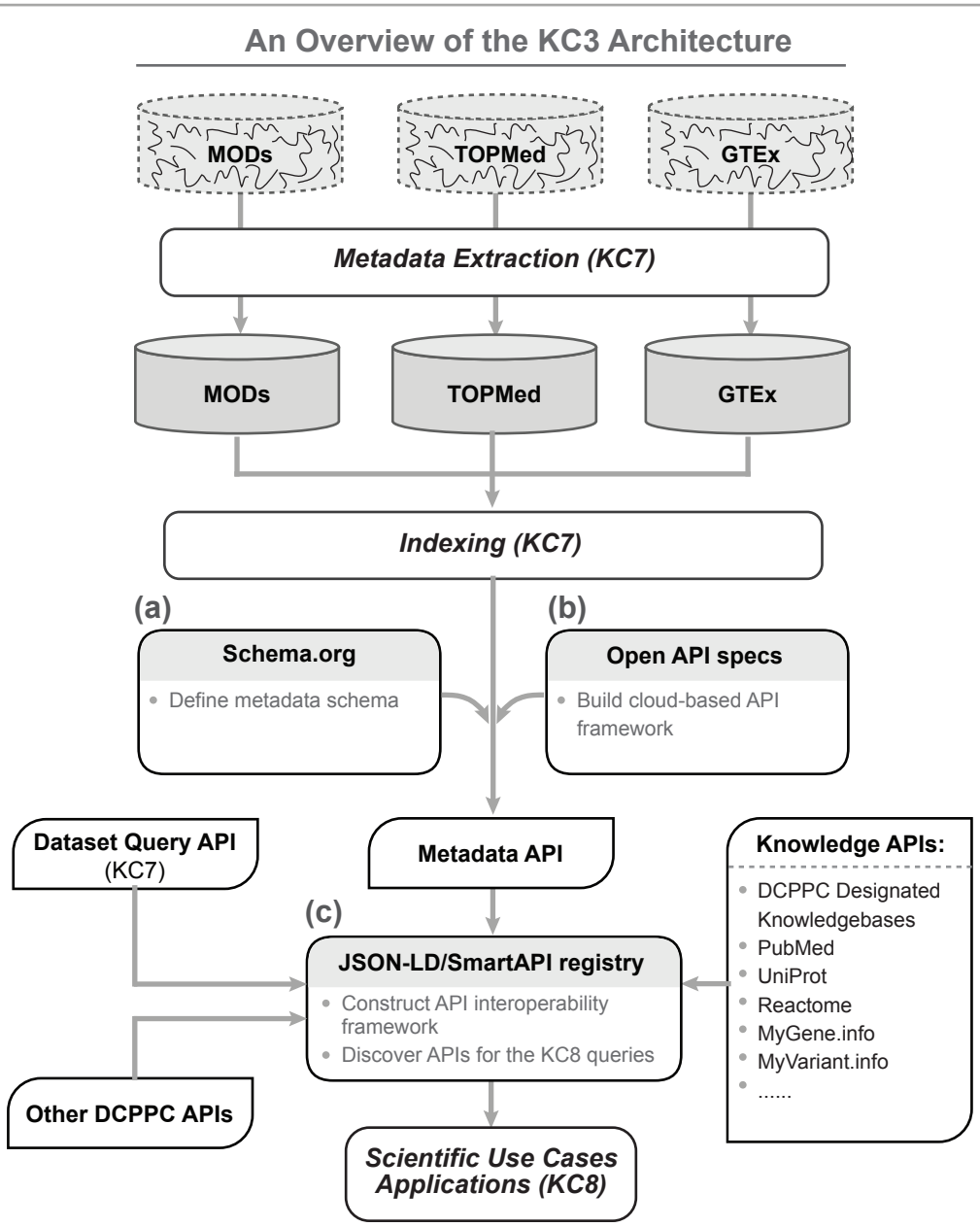

Fig 1. Open-standard Powered API Interoperability Architecture. (a) Define a metadata data schema following the schema.org standard; (b) Build a cloud-based API framework to create metadata API based on the defined data schema and Open API specs; (c) Construct an API interoperability framework to provide semantic annotations of all APIs from the KC3 and KC7 components, as well as other knowledgebase APIs. The relevant APIs can then be automatically identified to answer the specific scientific use cases in KC8.

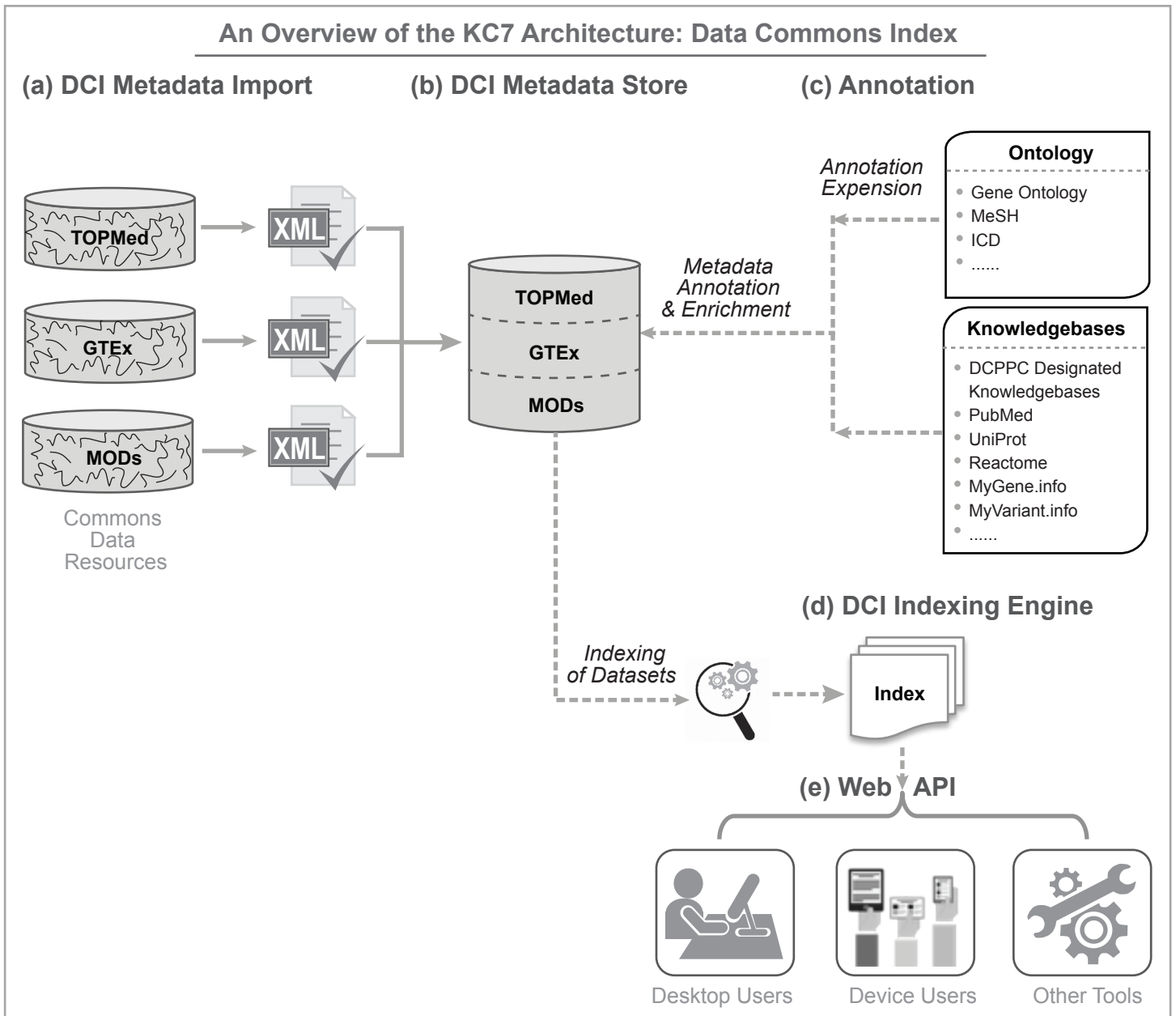

Fig 2. An Overview of the KC7 Architecture: Data Commons Index (DCI). (a) All resources will provide metadata for their data objects in a defined XML format. After validation, metadata will be imported (b) into the DCI and annotated, enriched, and (c) harmonised to use common reference resources and ontologies, including gene ontology, MeSH (Medical Subject Headings), and ICD (International Classification of Diseases). Nightly incremental indexing (d) will generate the Solr index files accesses by the search interface (e) on a broad range of devices, from classic desktop web applications to smartphones and third party APIs.

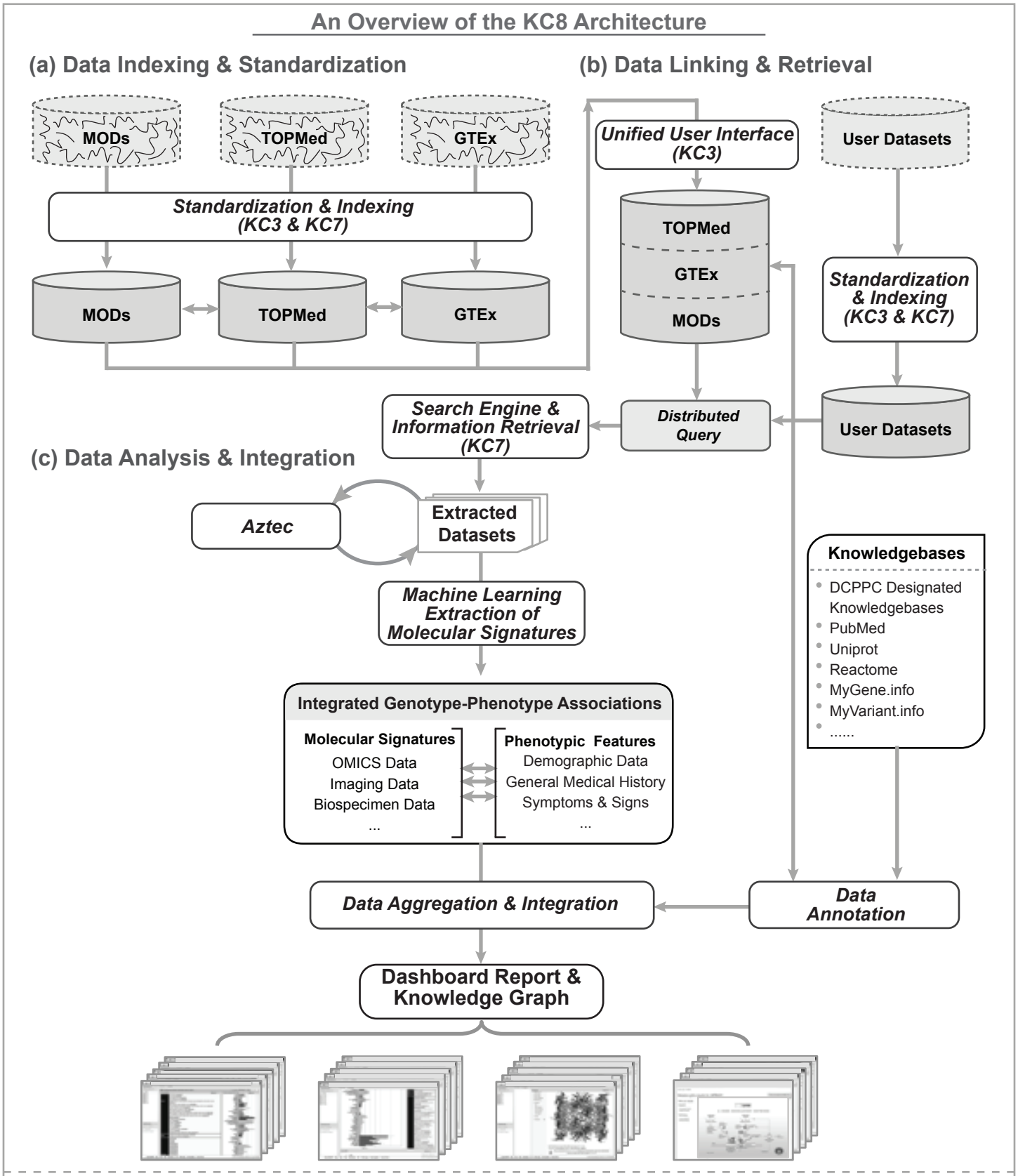

Fig 3. An Overview of the KC8 Architecture. This computational pipeline contains three major functional components: (a) Data indexing & standardization, which will automate the extraction and retrieval of metadata, create metadata templates (collaboration with KC3 & KC7), and standardize datasets to a common data representation format (collaboration with KC7); (b) Data linking & retrieval, which will link datasets together (collaboration with KC3), query using keywords and controlled vocabularies, as well as fetch and compile data from test-case datasets with that uploaded by user (collaboration with KC7); and (c) Data analysis & integration, which will mine genotype-phenotype associations via computational tools (indexed and identified by Aztec), retrieve annotations from relevant biomedical knowledgebases, as well as aggregate and integrate data to build knowledge graph visualization.