The ATLAS Event Index is a system which provides experts and users with event-level metadata services (finds information about specific events from the Event Index data rather than from event dataset files). Event Index stores data GUIDs as well as a variety of other event-wise information. All data are organized in TagFiles, which are implemented as Hadoop MapFiles. A set of TagFiles is a TagSet, which can be accessed in the same way as a TagFile. All TagFiles are registered in a Catalog. Each operation on the Event Index database is implemented as a transformation of TagFiles, its result is again a standard TagFile with common interface. TagFiles can be processed in the most general way by applying any valid (Java) code on a (set of) TagFiles. All operations are registered in a Journal. Some frequently-used operations have special interfaces.

Catalog keeps all information about TagFiles, their content, format, naming and basic characteristics. Catalog search is in most cases the first stage of general search.

Journal keeps track of all non-trivial operations, it allows to search for already delivered results, to investigate possible problems, to find usage patterns and usage statistics.

Event Lookup tables (one real data and one for Monte Carlo data) gives very fast mapping of event numbers to containing files. Tables are generated from imported HDFS files and keep references to them to allow more detailed searches and reporting.

Apache Tomcat servers provide load-balanced external access to data via several interfaces:
- Interactive Graphical Interface (service oriented or data oriented).
- Linux-like command line (requires small local client).
- Stateless Web Service

All interfaces implement the same functionality. External access is provided by Shibboleth system.

Special interfaces:
- Import of event metadata from ATLAS offline data.
- Searching with very flexible specification of queries and reports.
- Event Lookup for finding the location of events.
- Generation of histograms of any variable.
- Generation of trigger statistics histogram.
- Generation of dataset overlaps table.
- Generation of trigger overlaps table.

The system is integrated in the ATLAS offline environment and is available from all its distributions. It runs on the CERN Hadoop cluster. Currently, it handles over 80 billion events (data and Monte Carlo).

Future improvements:
- Query Spaces: All data are considered as entities in TagFile space. Operations are relations between entities. There is a measure allowing to assess entities distance. User can get immediate approximate (or correct) result to her request based on the view of the whole Query Space.
- Universal Command Line Client: A downloadable application running on all platforms.
- Migration to new data formats.