

Lanedo



Tracker is...

...a central repository of user information. W3C standards, [RDF](#) ontologies, [Nepomuk](#) and the [SPARQL](#) query language are the building blocks of this semantic data storage, designed for both desktops and mobile devices.

...a file indexer. It can crawl a configured set of directories in your file-system and index several different kinds of files, extracting and storing both meta-data and contents.

...a search tool. No matter where your information is stored, Tracker finds all your common media out of the box. Third-party extensions can provide indexing of additional file types and a powerful SPARQL-based interface satisfies the most complex query requirements.



Proven Technology

Tracker is the back-end for the content framework in Nokia's new [Harmattan](#) operating system, used in the new N9 and N950 devices.

Tracker is also the default media indexer for Intel's [MeeGo](#) platform and the central meta-data storage for the [GNOME Desktop](#).

Tracker was also used in previous iterations of Nokia's platforms including the [Fremantle](#) operating system.

Technologies and Standards

Tracker is written in [C](#) and [Vala](#), and uses common tools available in any Linux-based system:

- [D-Bus](#) technology for inter-process communication.
- Querying with SPARQL based on RDF.
- [freedesktop.org](#) standards like the [base directory](#), [shared configuration](#), [shared file-metadata](#) and [auto-start specifications](#).
- [Introspection](#) support, allowing applications and other libraries to use the Tracker interfaces in other languages at run time (e.g. [Python](#)).

Ontologies

Ontologies describe how data is related to each other. These ontologies are then translated into a database schema which is used to create tables inside the database. Tracker supports not only the common [Nepomuk](#) and [Dublin Core](#) ontologies, but also custom [Maemo](#) and Tracker ontology extensions.

Full Text Search

Through custom SPARQL extensions, Tracker provides Full Text Search capabilities with operations that are:

- **Case-insensitive.** Case folding is used to match for example “TITLE” with “title” or “Straße” with “Strasse”
- **Normalization agnostic.** No matter if the text is encoded in a composed or decomposed way, Unicode is used to provide a common normalization for all strings. For example, looking for “école” (NFC normalized, 0xc3 0xa9 0x63 0x6f 0x6c 0x65) will find files with the word “école” (NFD normalized, 0x65 0xcc 0x81 0x63 0x6f 0x6c 0x65).
- **Unaccented.** Tracker provides a custom method to strip characters of their combining diacritical marks, to allow comparisons between examples like “Idea” and “Idéa”.
- **Powerful.** You can look for texts containing:
 - An exact full word (e.g. “red”)
 - Prefixes (e.g. words starting with “gree”)
 - More than one word (e.g “red” and “blue”)
 - One word or another (e.g. “red” or “blue”)
 - Not containing a given word (e.g. without “yellow”)
 - Sentences (e.g.: “red, blue and green”)
 - Mixed filters (e.g containing the word “red”, a word prefixed with “gree” and without the word “yellow”).

Supported formats

Tracker currently supports around 20 built-in file type extractors including over 38 mime types:

- **Images:** JPEG, TIFF, GIF, PNG, BMP, SVG...
- **Documents:** PDF, MS Word/Excel/Powerpoint, Open Document Format, Postscript, Electronic Publication (ePUB), Abiword, HTML...
- **Audio/Video:** MP3, AAC, OGG/Vorbis, FLAC, AVI, MPEG, and every other format backed by the GStreamer framework.
- **Metadata containers:** EXIF, XMP, IPTC .

Tracker also provides [DLNA](#) mime types and profiles, which allow to easily build [UPnP](#) and DLNA compliant applications.

Integration

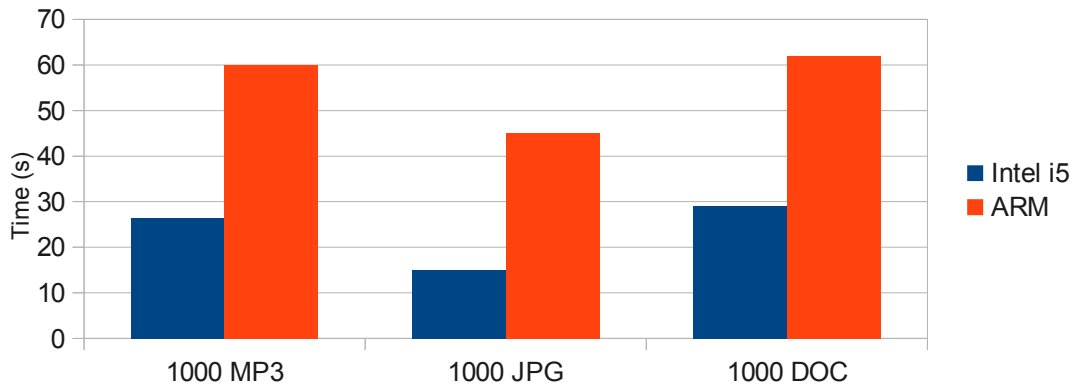
Tracker also comes with custom components for proper integration with several well-known applications:

- Email indexing in Mozilla Thunderbird and Evolution.
- Bookmarks from Mozilla Firefox.
- Tagging capabilities in the GNOME file manager (Nautilus).
- Text search in the GNOME Shell
- Integration with the GTK+ toolkit when using the file chooser dialog.

Indexing Performance

The file-system mining and file extraction operations are developed to be as fast as possible. The following chart shows the amount of time (in seconds) needed to find and index 1000 MP3 audio files, 1000 JPEG images and 1000 MS Word documents respectively.

The measurements were done both in a PC with an Intel i5-750 (4 x 2.66GHz) CPU and in a hand-held device with an ARM Cortex-A8 OMAP3630 (1 x 1 GHz) CPU.



Query Performance

To demonstrate the querying power (which is priority in Tracker over data insertion speed), the SPARQL queries below were tested on the ARMv7 target as mentioned before, measuring the time to complete them.

1. Querying Title, Author, Duration and Mime Type for 1000 MP3 audio files:
Time taken: **0.522s**

```
SELECT ?u
      nfo:duration(?u)
      nmm:artistName(nmm:performer(?u))
      nie:title(?u)
      nie:mimeType(?u)
WHERE { ?u a nfo:Audio }
```

2. Querying Width, Height, Comment and Mime Type for 1000 JPEG images
Time taken: **0.548s**

```
SELECT ?u
      nfo:height(?u)
      nfo:width(?u)
      nie:mimeType(?u)
      nie:comment(?u)
WHERE { ?u a nfo:Image }
```

3. Querying Title, Author and Mime Type for 1000 MS Word documents
Time taken: **0.528s**

```
SELECT ?u
      nie:title(?u)
      nco:fullname (?c)
      nie:mimeType(?u)
WHERE { ?u a nfo:Document .
       ?u nco:creator ?c }
```

Services

Tracker @ Lanedo

Since Lanedo has a majority in the core maintainers on the Tracker project, we are able to provide **development** of core features and general **maintenance**.

We can also help businesses write their own data miners or meta-data extractors for specific feature support, ensuring that they all fit perfectly into the existing framework.

Lanedo also offers **training** to help businesses understand more quickly to get the most out of it, and **support** to integrate Tracker into your existing system.

Contact us

Lanedo is a successful European company that provides Open Source and Free software consultancy services globally. Targeting platforms ranging from embedded devices to desktops, Lanedo provides first class software development services especially in open source communities enabling our clients to create world-class products.

Lanedo can offer support contracts, development, patch back folding, customization of a project or simply an evaluation.

For more information on how Lanedo and Tracker can help in your business, please contact:

 <http://www.lanedo.com/tracker>  info@lanedo.com  +49-40-53262211