

Project LAHTeX

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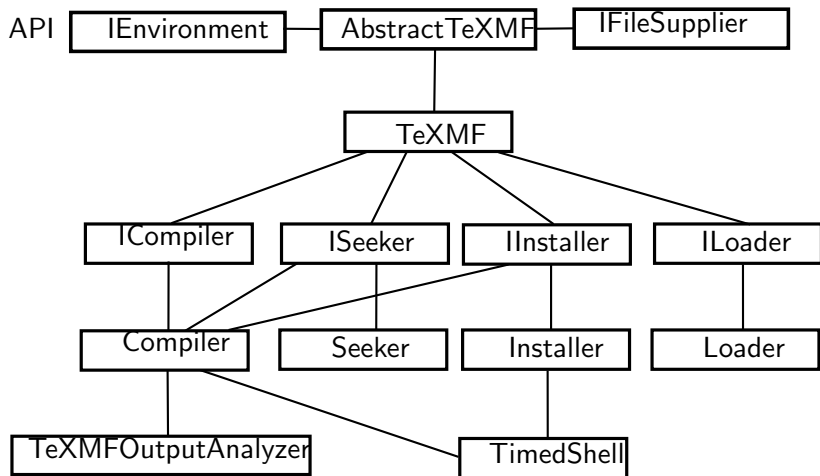
This slide is compiled using T_EXPortal

Introduction

LAHTeX is a project aiming to provide a simple Java library interface to support management and utilization of TeX Live \TeX and \LaTeX distribution

- ▶ In particular, it provides back-end service to my \TeX Portal Android application
- ▶ Note that the library could be extended to obtain a TeX Live manager on PC as well!
- ▶ This project depends on my LAHSpectre project for process invocation, streams processing and common interfaces.

Operational architecture



Main API

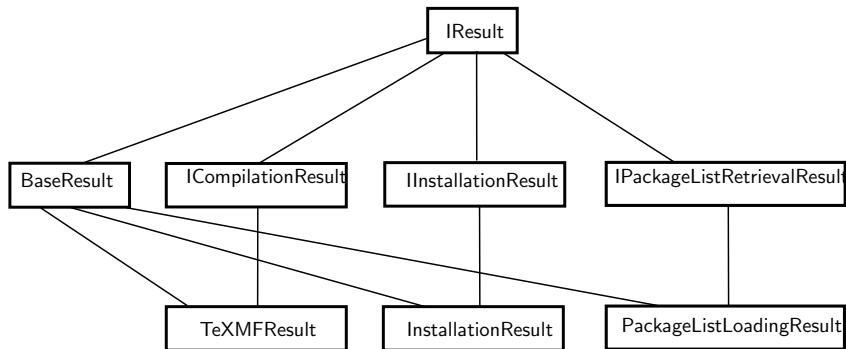
Defined at the top level and third level

- ▶ Client obtains an instance of abstract class `AbstractTeXMF` via the static method `getInstance(env)` where `env` implements the `IEnvironment` interface that provides distribution specific information such as system architecture, location to store binaries and $\text{T}_{\text{E}}\text{X}$ directories, etc.
- ▶ `AbstractTeXMF` combines services defined by `IInstaller`, `ICompiler`, etc interfaces namely compile a document & analyzes the output for missing packages, install a package, search for a package providing a file, retrieve the list of available packages.

Implementation: `TeXMF` implements `AbstractTeXMF` simply by delegating requests to specific operators.

Result hierarchy

API methods return an instance of `IResult` which contains any (first) `Exception` raised in its execution. The result hierarchy:



Note: Instances of `IResult` are *progressively* built. For example, the log is appended in `ICompilationResult` by `ICompiler` until invocation of `isComplete()` returns **true**.

Exceptions

LaTeX defines 3 Exceptions classes, all is traced back to some required file being unavailable

- ▶ `KpathseaException`: raised when a \TeX format, TeX Font Metric (TFM) file, MetaFont source, Packed Bitmap (PK) font, ... is unavailable
These files are either supplied in some TeX Live package or should be generated using some command (for example, `initex` to generate format).
- ▶ `SystemFileNotFoundException`: raised when a LaTeX dependency such as `xz`, `tar`, `ls`, ... executable or file-package index (needed to identify missing package) is missing
- ▶ `TeXMFFileNotFoundException`: raised when `tex`, `pdftex` or `mf` cannot find an input file (such as LaTeX styles `*.sty`)

Implementation details

- ▶ **Install a package:** simply compute dependency (using a pre-built depend file) get & extract the package & relocate extracted files in the directory structure, regenerate ls-R and do chmod; requires
 - ▶ An implementation of a system-specific IFileSupplier
For instance, T_EX_PØrtal obtains files from Dropbox (default) or user-defined mirror using DownloadManager in Android API
 - ▶ Standard UNIX programs (namely tar, xz, cp, rm, ls, chmod)
(These programs, except for xz, are provided by busybox in T_EX_PØrtal.)
- ▶ **List installed packages:** by listing package description files in the directory /tlpkg/tlpobj/

Implementation details (continued)

- ▶ **Package search:** using a pre-built index file in which each line is of form **package-name/file-list/** where **file-list** contains all files provided in that package, separated by slash
- ▶ **Compile documents:** run the process using TimedShell, recognize missing file from the standard output \Rightarrow find package(s) provide that missing file