
kyla Documentation

Release 2.0+alpha-1

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Mar 04, 2017

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Contents:

Repository build description

Installer repositories are compiled by using `kcl build`. This requires an Xml file that describes how to build a file repository. Here's an example repository file:

```
<?xml version="1.0" ?>
<Repository>
  <Features>
    <Feature Id="7f9e0d24-1c82-49d3-86f9-47c0a7c984d5">
      <Reference Id="c9a41343-bc90-4871-84bd-27f04aac4794"/>
    </Feature>
  </Features>
  <Files>
    <Group Id="c9a41343-bc90-4871-84bd-27f04aac4794">
      <File Source="A:\full\path\file.exe" Target="bin/file.exe"/>
    </Group>
    <Packages>
      <Package Name="bin">
        <Reference Id="c9a41343-bc90-4871-84bd-27f04aac4794"/>
      </Package>
    </Packages>
  </Files>
  <UI>
    <FeatureTree>
      <Node Description="Binary files." Name="Binaries">
        <Reference Id="7f9e0d24-1c82-49d3-86f9-47c0a7c984d5"/>
      </Node>
    </FeatureTree>
  </UI>
</Repository>
```

Reference

The repository stores various objects which can be referenced. In general, anything which has an `Id` attribute can be referenced, and all references are done by adding a `Reference` node. Objects can be grouped by using a `Group` node, this makes it possible to reference many objects using a single `Reference`.

- `Repository` is the top level node and must be always present.
- `Features` contains the feature list. A feature must reference another object in the repository, and must not reference another feature.
- `Files` describes all file objects and the storage layout.

If present, `Packages` is used to group files into packages. A `Package` must have a name and it must reference an object from the `Files` tree. Files which are not explicitly packaged are automatically placed into a `main` package.

- `UI` contains UI related data. This data is only present in source packages and never deployed, but it's used to create the installation UI.

The `FeatureTree` defines the feature grouping. At least one `Node` must be present, and every node must reference at least one `Feature`. Nodes can be arbitrarily nested.

Repository types

kyla supports several *repository types* with different capabilities. The built-in types are:

- **Deployed:** A deployed repository is the “installed” state, that is, the content objects are stored with their actual file name, and some content objects may be duplicated. A deployed repository supports repair, add/remove, and validation.
- **Packed:** A packed repository consists of the database and one or more package files. Content objects are spread over package files. A packed repository supports only validation.

A Packed repository can be also be used for web installation. Putting all files onto a server which supports [HTTP range requests](#) makes the packed repository readable over the web.

Supported operations

Type	Installation source	Verify	Repair	Configure
Deployed	Yes	Yes	Yes	Yes
Packed	Yes	Yes	No	No

Comparison with other tools

NSIS

The [Nullsoft Scriptable Install System](#) is a popular and fully fledged installation system. It works at a much higher level than kyla and supports the creation of shortcuts, has a scripting language, and creates self-extracting installations.

The main differences are:

- kyla has native support for updating and updates only the required files - NSIS does not have built-in support for this.
- NSIS is not designed for integration - it takes care of dialogs, for example - while kyla is.
- NSIS does not support repairing or changing installations.
- NSIS supports only Windows (the generated installers only support Windows)¹.

InnoSetup

[InnoSetup](#) is another popular Windows installation system. Similar to NSIS, it provides a high-level installation framework, and comes with it's own scripting engine and even an IDE.

The main differences are:

- kyla has native support for updating and updates only the required files - InnoSetup can update, but it is not aware which files have changed and which haven't.
- InnoSetup is not designed for integration - it takes care of dialogs, for example - while kyla is.
- InnoSetup does not support repairing or changing installations.
- InnoSetup supports only Windows.

¹ From <http://nsis.sourceforge.net/Features>: Generated installer will still run on Windows only

Windows Installer

Windows Installer is also a fully fledged runtime for installations which is bundled with Windows. It is comparable with kyla as it also uses a database, but there are again many differences:

- kyla can install directly from web, while the Windows Installer will download a package first before it starts installing².
- Windows Installer does not support modern compression algorithms. Only cabinet files are supported.
- Windows Installer cannot split a file when creating an installation media - very large files will result in very large packages.³
- Windows Installer supports only Windows.

² From [https://msdn.microsoft.com/en-us/library/windows/desktop/aa368328\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/aa368328(v=vs.85).aspx): If the installation database is at a URL, the installer downloads the database to a cache location before starting the installation.

³ From <http://www.joyofsetup.com/2011/06/21/wix-and-cabinetry/>: On the flip side, any individual files that are larger than the maximum size go into a single-file cabinet, so it's possible that such cabinets will be larger than the maximum size.

kyla 2.0

Warning: This release contains a breaking change of the file format. Kyla 1.0 will fail to open a package created with Kyla 2.0 and vice versa.

- Changed database format for improved forward compatibility.
- kyla uses now a feature-based definition instead of the previous file-set centric approach. This changes both the database structure, as well as the repository definition structure.
- The Python generator has been rewritten.
- The `kui` sample UI has been rewritten, and kyla learned how to provide UI related information.
- Zstd compression is available as an alternative to the default Brotli compression.
- The `KYLA_MAKE_API_VERSION` macro has been fixed.
- The repository builder can print out various statistics now, for instance, the final compression ratio.
- kyla supports file content encryption.

Note: The encryption only encrypts the file contents, so file names, sizes, and even the hashes of the content will remain visible. In particular, the database itself is not encrypted.

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Acknowledgements

- Andreas Weis (der_ghulbus@ghulbus-inc.de)
- Raymund Fülöp (r@ymund.de)

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```
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zlib

version 1.2.8, April 19th, 2010

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://www.ietf.org/rfc/rfc1950.txt> (zlib format), [rfc1951.txt](http://www.ietf.org/rfc/rfc1951.txt) (deflate format) and [rfc1952.txt](http://www.ietf.org/rfc/rfc1952.txt) (gzip format).

Zstd

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kyla is an installation system designed to deploy large amounts data. The main features are:

- **Speed:** kyla uses fast compression algorithms, reads and writes files sequentially, and only fetches the data it absolutely needs.
- **Scalability:** Tens of thousands of files can be deployed easily. kyla also has first-class support for large binary files, splitting them up as necessary to provide streaming installations.
- **Web-first:** kyla can install directly from the internet, fetches only the minimum amount of data required, and installs during download to maximize bandwidth usage and minimize installation time.
- **Feature-based installation:** Deploy only subsets of your application, and support configure functionality.
- **Upgrades, downgrades, configure:** kyla can upgrade/downgrade your installation to another version and will only fetch changed contents. Upgrades, downgrads and configurations are handled through the same function.
- **Library design:** kyla is designed to be embedded into your frontend. It provides an easy-to-use C API and can be statically or dynamically linked.
- **Reliability:** It uses the [SQLite](#) storage engine for all metadata storage - one of the most robust databases in the world. Installations can be validated and repaired if they ever get corrupted.

Note: kyla is not a full-fledged installer taking care of registry keys, registering services, or similar. It is designed to deploy and manage applications in a single folder. If you need additional pre/post install hooks, you can easily build them on top of kyla. For a comparison with existing tools, check out the [Comparison with other tools](#).

kyla consists of three separate parts:

- `kcl`, the kyla command line binary. It includes a command line front-end to the API, as well as access to the kyla build API.
- `kui`, the kyla UI. This is a small UI which can perform an installation, up/downgrades, and configure operations.
- `pykyla`, the kyla utility library. A Python module which facilitates the repository description creation.
- `libkyla`, the core library which contains all processing logic. `libkyla` provides a C API for clients for integration.