



ALMA Common Software Basic Track

Software Engineering Basics





- ✧ Set of related files grouped together in a directory structure
- ✧ Includes
 - ✧ Makefile
 - ✧ Implementation files (classes)
 - ✧ Unit tests
- ✧ Usually, a single component is stored in a single software module



Directory Structure



- ✧ `<module>/idl` Generic interface definition
- ✧ `<module>/include` Language specific header files (C++)
- ✧ `<module>/src` Source code
- ✧ `<module>/lib` Application/test code libs*
- ✧ `<module>/bin` Executables*
- ✧ `<module>/test` Test code (separated from app. code)

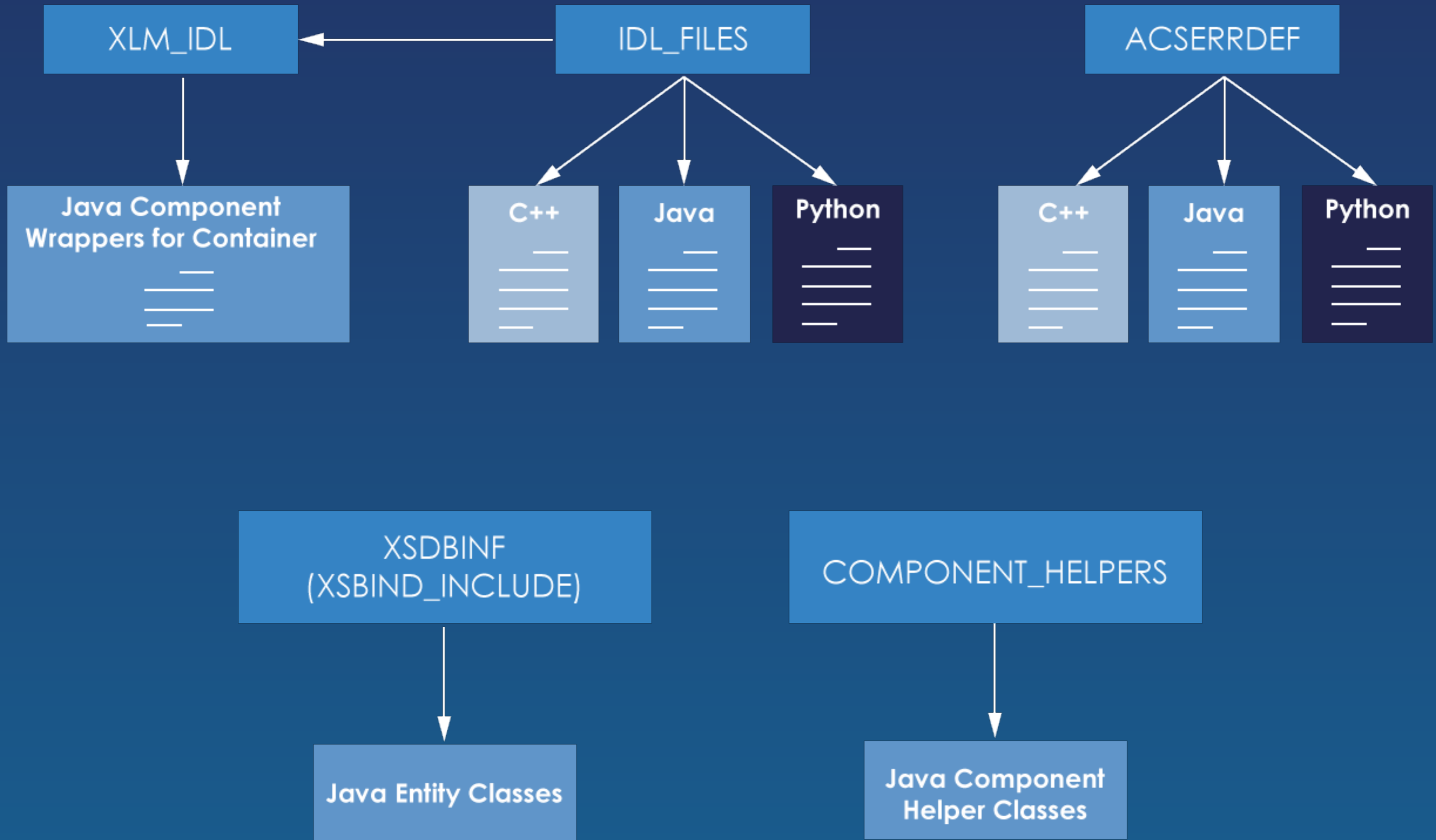
(*) Populated by the `Makefile`



ACS Makefile



- ✧ Project wide set of rules, centrally managed: `$ACSR00T/include/acsMakefile`
- ✧ Each developer has to add only the module specific part → file names
- ✧ Based on a normal `Makefile`
- ✧ Strictly correlated to the environment variables and software module standards





Test directory



- ✧ Place for all module specific test files
- ✧ Contains its own `Makefile`
- ✧ Usually contains a small CDB for component testing (deployment example)



ACSR00T



- ✧ Default location of installed ACS binaries and libraries
- ✧ Directory structure similar to module structure
- ✧ Reference through the `$ACSR00T` environment variable
- ✧ Populated during build, if no `INTR00T` defined
- ✧ Convention: **do not overwrite it**, use an `INTR00T` instead (next slide)



INTROOT



- ✧ Location for binaries and libraries for system parts under development
- ✧ Directory structure almost identical to `ACSRROOT`
- ✧ Reference through the `$INTROOT` environment variable
- ✧ Populated through `Makefile` build (`make install`)

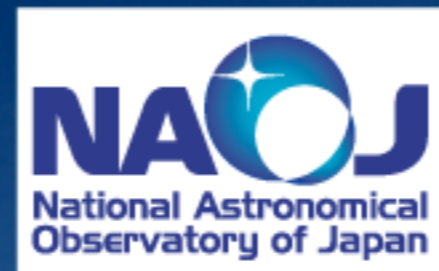


getTemplate utility



- ✧ Tool to create ACS directory structures
- ✧ Also provides templates for files according to SE standards
 - ✧ Makefile
 - ✧ C++ headers and sources
 - ✧ ...
- ✧ Executables: `getTemplate`, `getTemplateForDirectory`

Questions?



Acknowledgements

ACS presentations were originally developed by the ALMA Common Software development team and has been used in many instances of training courses since 2004. Main contributors are (listed in alphabetical order): Jorge Avarias, Alessandro Caproni, Gianluca Chiozzi, Jorge Ibsen, Thomas Jürgens, Matias Mora, Joseph Schwarz, Heiko Sommer.

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI) and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.