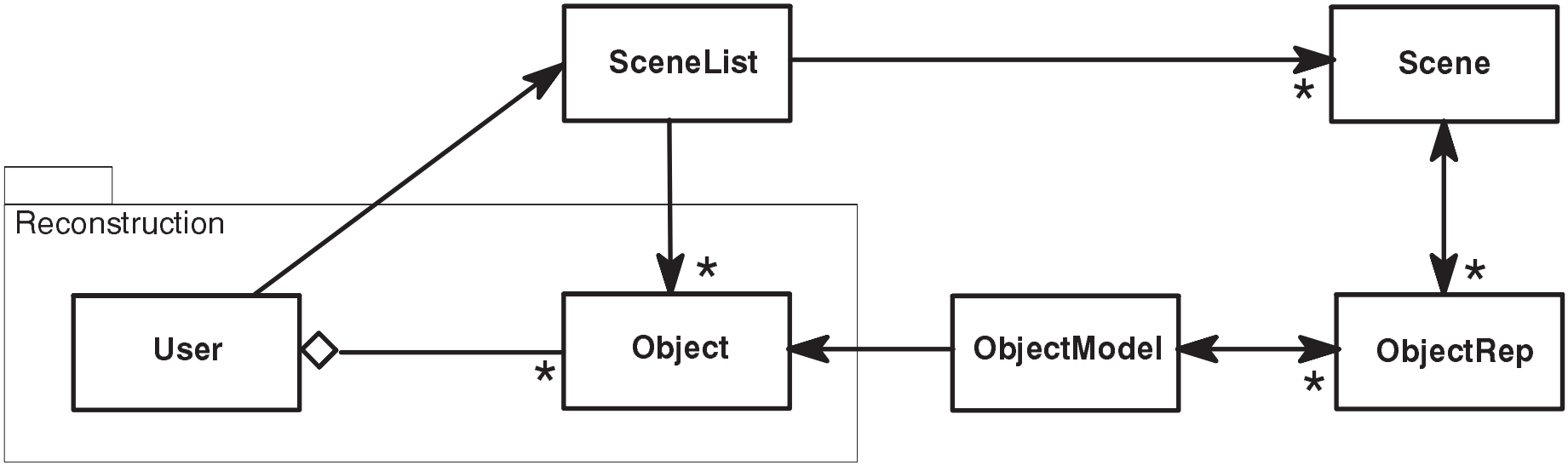
Can Java & C++ live together ?

(in Atlas Graphics)

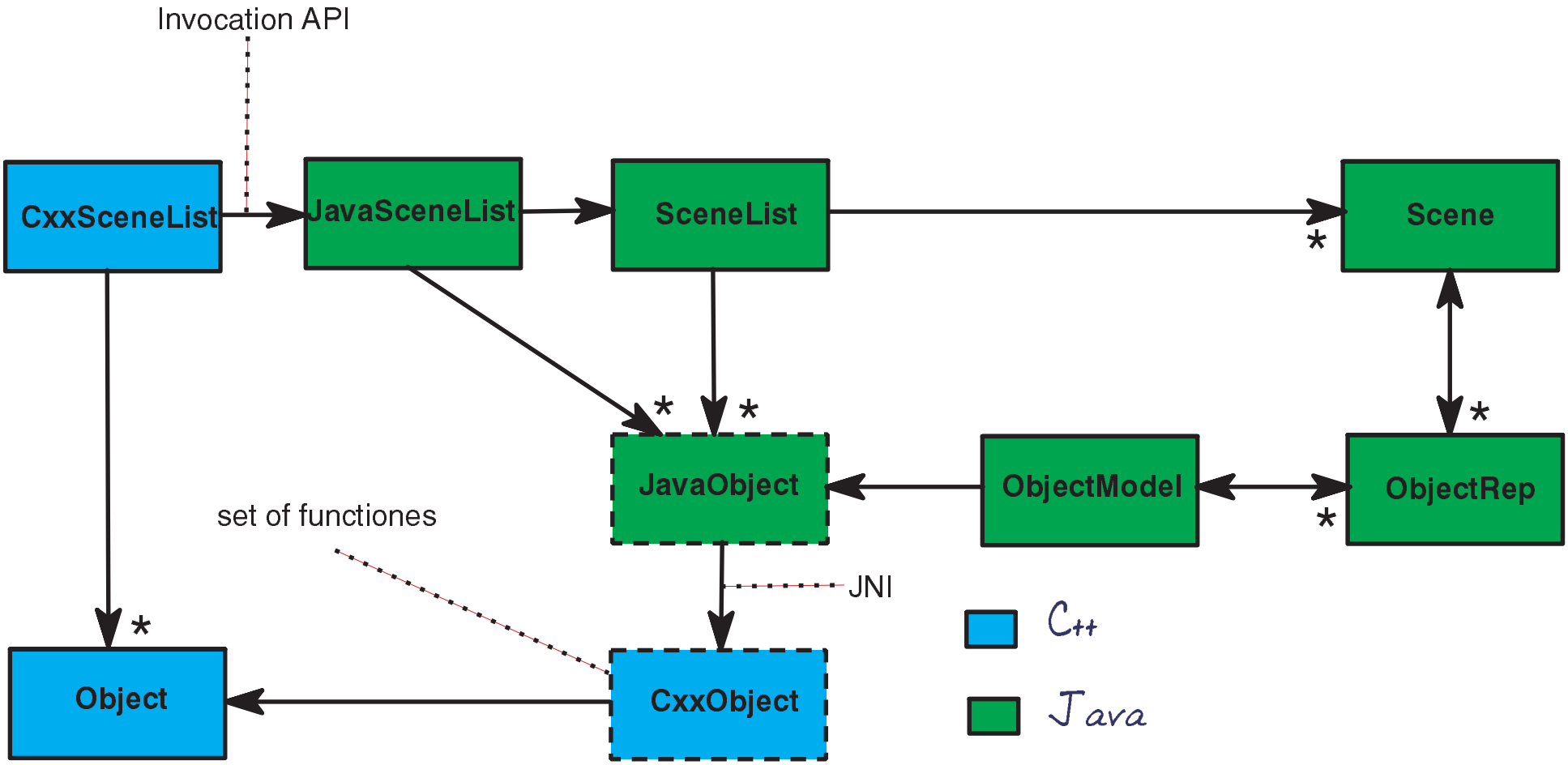
- ☺ major Graphics & Analysis applications are written in Java (WIRED, jAtlantis, GraXML, JAS)
- ☺ Java is better language
- ☹ Reconstruction++ software is written in C++
- ○ major fear is interoperability between Java and C++
- ➲ we should try to see whether it is realy so difficult
- ○ I've tried and this is what I've found ...

One Language Environment



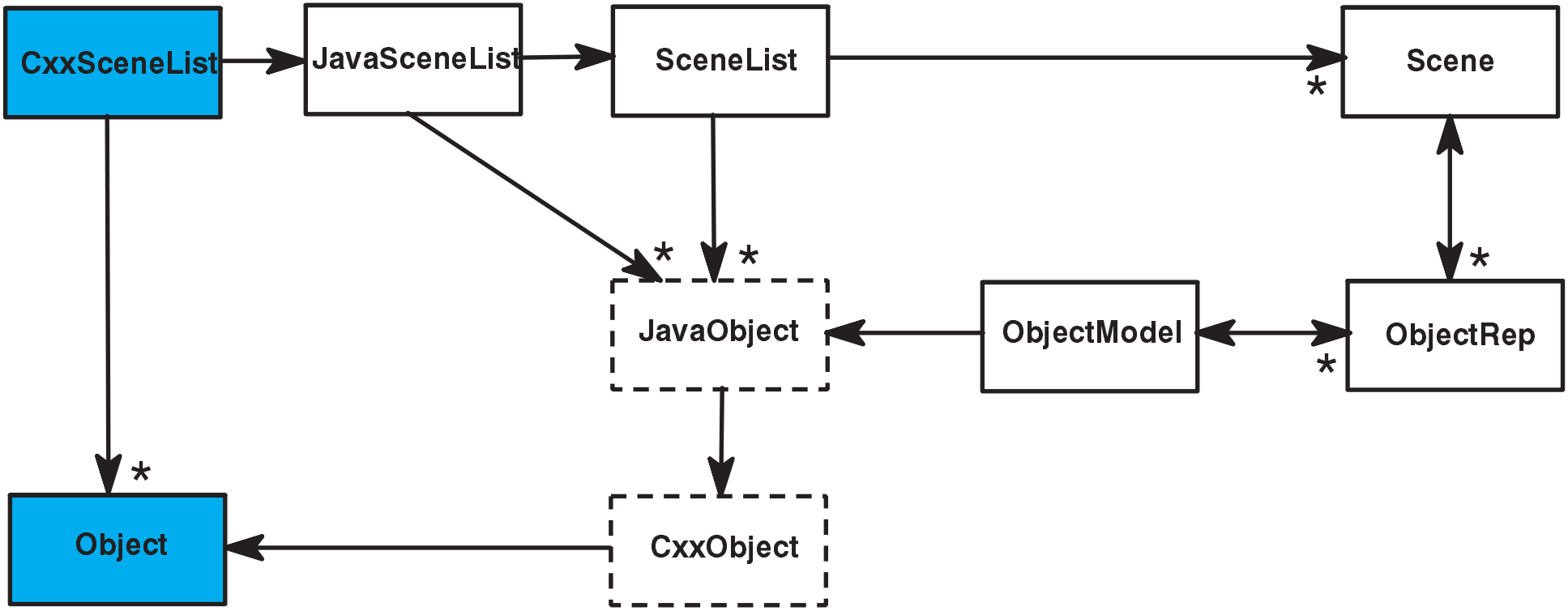
- very strict interface:
  - → Reconstruction doesn't see details of Graphics
  - → Graphics doesn't work directly with Reconstruction Objects
- language independent (both C++ and Java implementation exist)

Java & C++



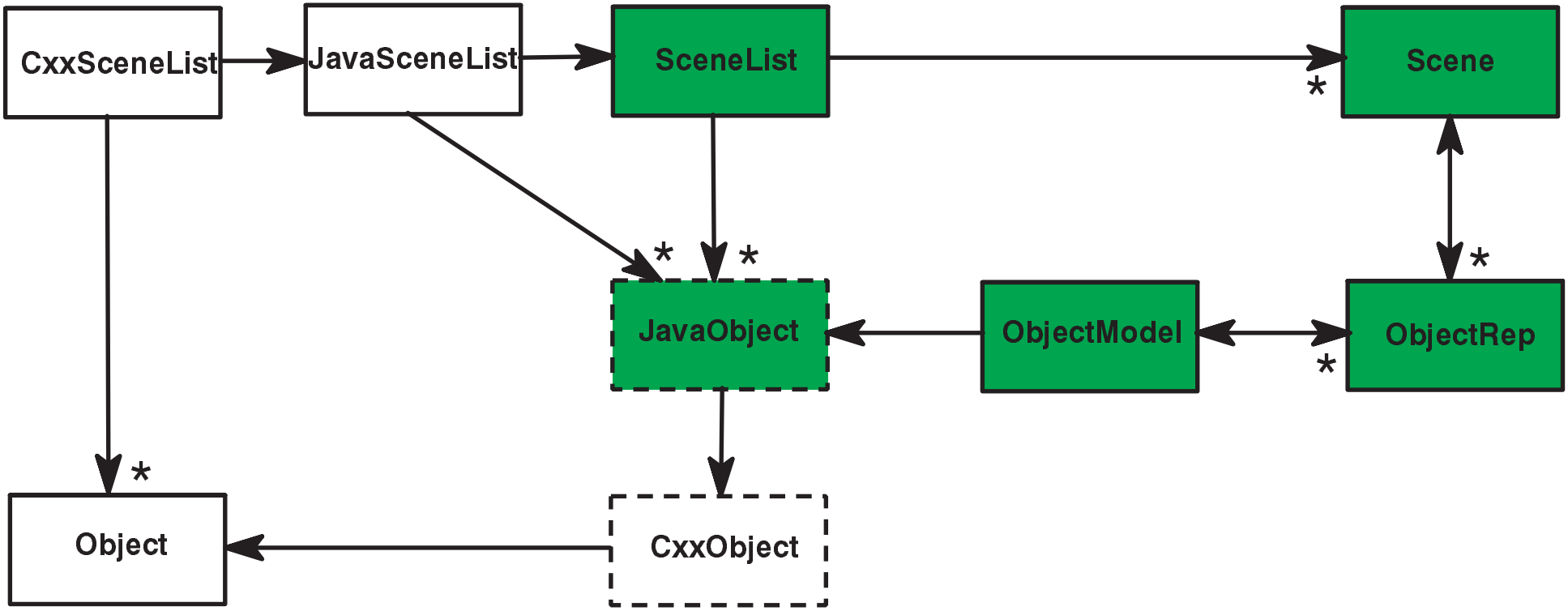
Pointer, casted to int, is passed from CxxSceneList to CxxObject so SceneList can access Object via CxxObject and JavaObject later.

Java & C++



Reconstruction (User) sees the same environment as before - all in C++.

Java & C++



Graphics (Developer) sees the same environment as before - all in Java.

Q & A

- could it
  - map
    - inheritance, relations, aggregation ? - possible
    - non-primitive arguments ? - tricky
    - templates ? - difficult
  - operate at runtime ? - Java easy, C++ difficult
  - be generalised ? - not much
  - be used for other (strict) interface ? - yes, after small re-design
  - pass Exceptions ? - yes
  - handle memory ? - ?
  - be debugged ? - with difficulties (F77/C++/Java)

Status

- ☺ both C++ and Java Frameworks exist
- ☺ Bridge package can be used to access C++ object from Java - all proxies are created automaticaly from idl-like file
- ☺ as a test, Java Reps for C++ TruthTrack have been implemented, they exist for Text, XML and JAS Scene
- ☺ it could be run from modified Paso
- ☹ the biggest problem is configuration management as SRT doesn't support Java

Conclusions

- ☺ it is possible
- ☺ it is not extremely difficult
- ☺ it can be done in a transparent way
- ☹ implementation is ugly (but only original developer sees it)
- ➢ it requires:
  - ➢ good Domain Decomposition with strict interfaces
  - ➢ one Domain = one Language
  - ➢ some efford (cca half FTE)
  - ➢ discipline ("Don't cross borders except on approved crossings ?!")