What’s new in BABEL 0.11.0

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Babel 0.11 represents 6 months of development

- The last 3 Babel releases were off the 0.10.6 branch... not the HEAD
0.11 release is a MAJOR step to 1.0 Release Criteria

- 25 issues identified in December 2003
- Some have been added, others deferred over the years
- 23/27 of criteria are satisfied with the 0.11.0 release
- (remaining 4 are “in progress” dealing with parsing & type resolution)
Two Biggest changes in 0.11 have own technical presentations

- Introducing RMI -- James Leek
  - Babel is no longer just a language interoperability tool.

- Cxx → UCxx Transition – Tom Epperly
  - Officially deprecating a language binding.
    (You have been warned!)
RMI had a very long gestation

- **Dec 2000**: First appearance of RMI in a talk to CCA @Gatlinburg. (It is assumed in a broader context of general SIDL interfaces for MxN.)
- **July 2001**: 1st public release of Babel. 0.5.0
- **Dec 2003**: RMI appears as 1.0 Release Criteria
- **July-Dec 2004**: Nija Shi (intern, UC Davis) worked on C Stubs & prototype server in Python
- **Sept-Nov 2004**: Substantial retooling of IOR to support RMI. (r4007—r4122 in svn)
RMI had a very long gestation

- **Feb ’05-present:** Jim Leek takes on RMI full-time.
  - finishes BabelRMI API spec
  - does TCP/IP-based implementation (distributed in sidlx)
  - implements access in all language bindings
  - discovers/resolves all the corner cases (dragging Tom and Gary into serious head scratching mode on several occasions.)
Now that vision becomes reality... almost

- **Vision:** Users would download a new release, and all their Babelized code would be instantly distributed code as well.

- **Reality:** Very close to true, but two big user-visible changes
  - *runtime exceptions* – a remote method may suffer a network failure
  - *casting* – initial handle to remote object may be insufficient after downcast
These changes affect ALL users, even with plain in-process Babel.

Added implicit sidl.RuntimeException to every SIDL method (not array accessors).

- Changed _cast() to addRef its return value
  - 1. runtime exceptions: a remote method may suffer a network failure
  - 2. casting: initial handle to remote object may be insufficient after downcast
These changes are A Good Thing™ anyway

- Implicit Exception
  - Before, many language bindings caught exceptions/errors internally but had no way to signal user code
  - Considering exceptions such as MethodNotImplemented, LanguageSpecific, etc.

- _cast() bumps ref count:
  - Makes _cast() more consistent with everything else. Every other out parameter and return value already increases ref count.
Changes in C++ support

- Deprecating original C++ binding
  - Namechange: cxx → dcxx
  - Feature lag: many 0.11 features not available in dcxx
- UCxx binding will be new C++ in 1.0
- 0.11.0 is transition time
- UCxx binding had suffix change
  {hh,cc} → {hxx,cxx}
0.11 also includes ALPHAs of important things to come

- New configure flag: `--with-mpi`
- New compilation help: `babel-cc` (and friends)
- New babel option: `-P` (experimental parser)
./configure --with-mpi

● **Now:** Only supports MPI-1 + ANSI C

● **Future:**
  - Will support MPI-1 & MPI-2
  - Will probe mpicc, mpif90, etc. for all kinds of CFLAGS, LDFLAGS, etc.

● **Why:**
  - ./configure CC=mpicc has “issues”
  - Ties into babel-cc scripts
Follows the mpicc idea... but

- Also front-end for babel-libtool
- Also understands multi-languages

```
babel-cc -o prog --with-mpi \ 
    --with-cxx *.lo
```

- Even if you don’t use it regularly, the
  --dry-run

  option can be helpful
Experimental Parser

- Moving from single-pass parser & immediate type resolution
- … to multi-pass with lazy resolution
- Adding a bunch of syntactic corner cases along the way
- HOPING (not promising) to have new one in place for Babel 1.0!
Acid test for new Parser

- Diff the entire Babel source tree
  - Only timestamps & metadata should change
  - Same symbol tables & code generators, after all
Final Note for Babel Modders

- If you make a patch for Babel (includes sumo distros), please...
  - Create (in the patch) a unique *.txt file in babel/runtime/patches
    - Filename: <14 chars is also the patch name
    - Line 1: short (<40 char) description of patch
    - Line 2: email of primary author or list
  - Email the patch to babel-dev@llnl.gov

- `babel-config --version-full` will properly report the patch to users
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