Babel Support for FORTRAN 90: Status

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Overview

- Initial Goals
- Modifications
  - Command Line
  - SIDL Runtime
  - Back-end
    - Directory structure
    - Fortran
    - Writer
  - Regression Tests
  - Build System
- Example
- Future Work

A minimalist approach has been taken for quicker turn-around.

Feature	F77	F90	Comment
File extension	.f	.f90	Standard
Format	Fixed	Free	Although F90 handles both, the Impls are generated in free-form
Comment style	C	!	
Subroutine termination	end	end subroutine	
Use statement	---	New splicer block	
Subroutine name lengths	---	---	*See Tom Epperly's talk.*

Initial modifications focus on maximizing code re-use within the Babel compiler.

- Support new language option at command line
- Generalize existing back end code
  - Directory change (i.e., f77 ➔ fortran)
  - Common
  - Fortran
  - Writers
- *Utilize tweaked F77 regression tests for F90*
- *Modify build system to support "standard" autoconf macros for F90/95*

~~Modifying the build in a general way has been a *very painful* process!~~

- Documentation

Only 7 compiler files were impacted by the modifications.

Compiler Source	Change(s)
UserOptions.java	Recognizes F90 as a valid language.
backend/ CodeGenerationFactory.java	Registers F90 server, client, and makefile generators.
backend/ CodeConstants.java	Has F90 comment character and impl file extension.
backend/fortran/ Fortran.java	Returns ".f90" impl extension when target language is F90.
backend/fortran/ ImplSource.java	Generates sub's splicer block, indents arg declarations, and ends subroutine properly for F90.
backend/fortran/ StubDoc.java	Indents arg declarations and ends subroutine for F90.
backend/writers/ LanguageWriterForFortran.java	Initializes the first tab stop, tab spacing, line break, and comment for F90.

Command line changes simply involve adding the new language identifier.

Usage babel [-h | --help]
or babel [-v | --version]
or babel *option(s) sidlfilename1 ... sidlfilenameN*
where help, version, and option(s) are

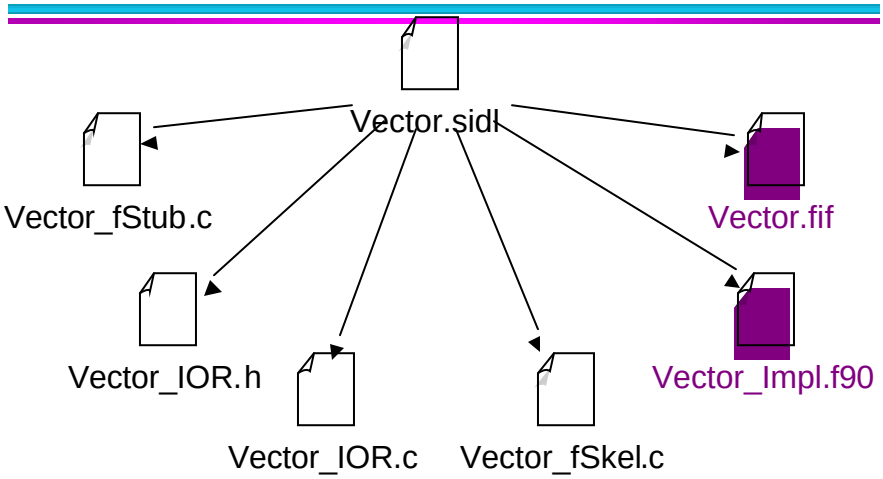
-h	| --help	Display usage information and exit.
-v	| --version	Display version and exit.
-p	| --parse-check	Parse the sidl file but do not generate code.
-x	| --xml	Generate only SIDL XML (for repository update).
-c*lang*	| --client=*lang*	Generate only client code in specified language (C | C++ | F77 | F90 | Java | Python).
-s*lang*	| --server=*lang*	Generate server (and client) code in specified language (C | C++ | F77 | F90 | Python).
-o*dir*	| --output-directory=*dir*	Set Babel output directory ('.' default).
-R*path*	| --repository-path=*path*	Set semicolon-separated URL list used to resolve symbols.
-g	| --generate-subdirs	Generate code in subdirs matching package hierarchy.
--no-default-repository		Prohibit use of default to resolve symbols.
--suppress-timestamp		Suppress timestamps in generated files.
--generate-sidl-stdlib		Regenerate only the SIDL standard library.

As an example, suppose we have a vector spec that includes a norm interface.

```
interface Vector {
   double norm ();
...
}
```

Vector.sidl

Currently generated F90 files are very similar to their F77 counterparts.



Would like to see some examples of real F90/95 code to help define the module file.

The resulting Impl file snippet below illustrates the generated code.

```
subroutine Vector_norm_impl(self, retval)
  ! DO-NOT-DELETE splicer.begin(Vector.norm.use)
  !    Insert use statements here…
  ! DO-NOT-DELETE splicer.end(Vector.norm.use)
  implicit none
  integer*8 self
  double precision retval

! DO-NOT-DELETE splicer.begin(Vector.norm)
!    Insert the implementation here…
! DO-NOT-DELETE splicer.end(Vector.norm)
end subroutine
```

Vector_Impl.f90

Future Work

- Near term
  - Complete build changes
  - Complete F90 regression tests
  - Update the User's Guide
- Long term
  - Address Fortran 90 array descriptors
  - Generate module files
- *Anything else?*