Interoperability Improvements

Chapel versions 1.21 / 1.22
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Outline

- Exporting Bytes to Python
- Next Steps
Exporting Bytes to Python
Exporting Bytes: Background

• Chapel didn’t support exporting procedures taking/returning ‘bytes’, only ‘string’

• Chapel ‘string’ type was mapped to Python ‘bytes’
  • Users had to ‘.decode()’ the ‘bytes’ sent to Python to get a ‘str’

• ‘bytes’ couldn’t contain null bytes
  • When it did, the bytes value would be truncated there prematurely (as in C)
Exporting Bytes: This Effort

• Added support for exporting Chapel ‘bytes’

  • Can be returned by value:

    `export proc retBytes(): bytes { return 'foo'; }`

  • Can be passed as an argument with the ‘in’ intent:

    `export proc bytesArg(in msg: bytes) { writeln(msg); }`
Exporting Bytes: This Effort

• Chapel ‘string’ type now maps to Python ‘str’
  • Chapel decodes Python ‘bytes’ to Python ‘str’ automatically

• Both ‘string’ and ‘bytes’ can contain null bytes

  // Note the null in the middle:
  export proc embedNull(): string { return ‘F\x00oo!’; } # In a Python interpreter...
  >>> test.embedNull()
  ‘F\x00oo!’
Interoperability: Next Steps
Interop: Next Steps

- Support returning arrays of ‘string’ and ‘bytes’ from exported functions
  - On master already (1.23 pre-release)
- Support passing arrays of ‘string’ and ‘bytes’ as arguments
- Support use of arrays in multi-locale libraries
- Support automatically exporting records and their methods to Python
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