

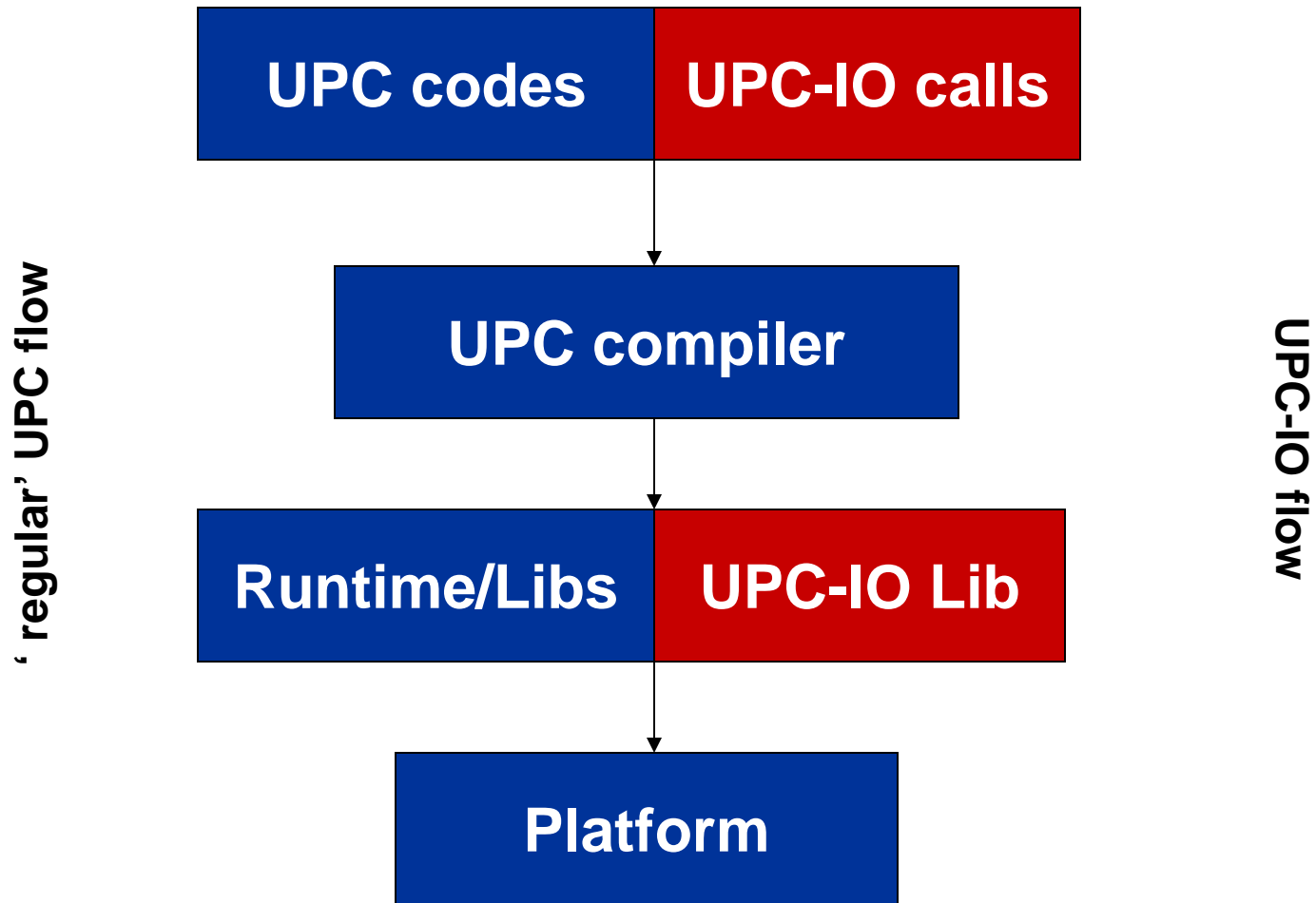
UPC-IO Reference Implementation

GWU and ANL

Objectives

- ◆ **Build a workable version of UPC-IO Library**
- ◆ **Develop UPC-IO testing suite to examine the correctness**
- ◆ **Develop UPC-IO benchmarks to evaluate UPC-IO implementations**
- ◆ **Provide feedback and guidelines to Library developers**
- ◆ **Provide feedback to guide future changes to the UPC-IO Specifications**

The Big Picture

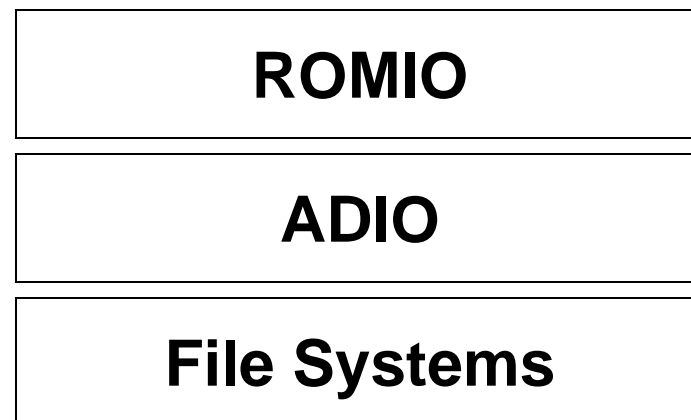


Our Approach

- ◆ **Gain experience with ROMIO and MPI-IO**
- ◆ **Identify implementation alternatives for UPC-IO**
- ◆ **Create implementation plan**
 - **Short term**
 - **Long term**
- ◆ **Testing and benchmarking**

Experience with MPI-IO/ROMIO

- ◆ MPI-IO is IO APIs introduced in MPI-2
- ◆ ROMIO is an open source reference implementation of MPI-IO from ANL
- ◆ ROMIO is built on top of ADIO (abstract device IO) to be system independent



Alternative Implementations

Short-Term Plan

UPC-IO

MPI-IO

File Systems

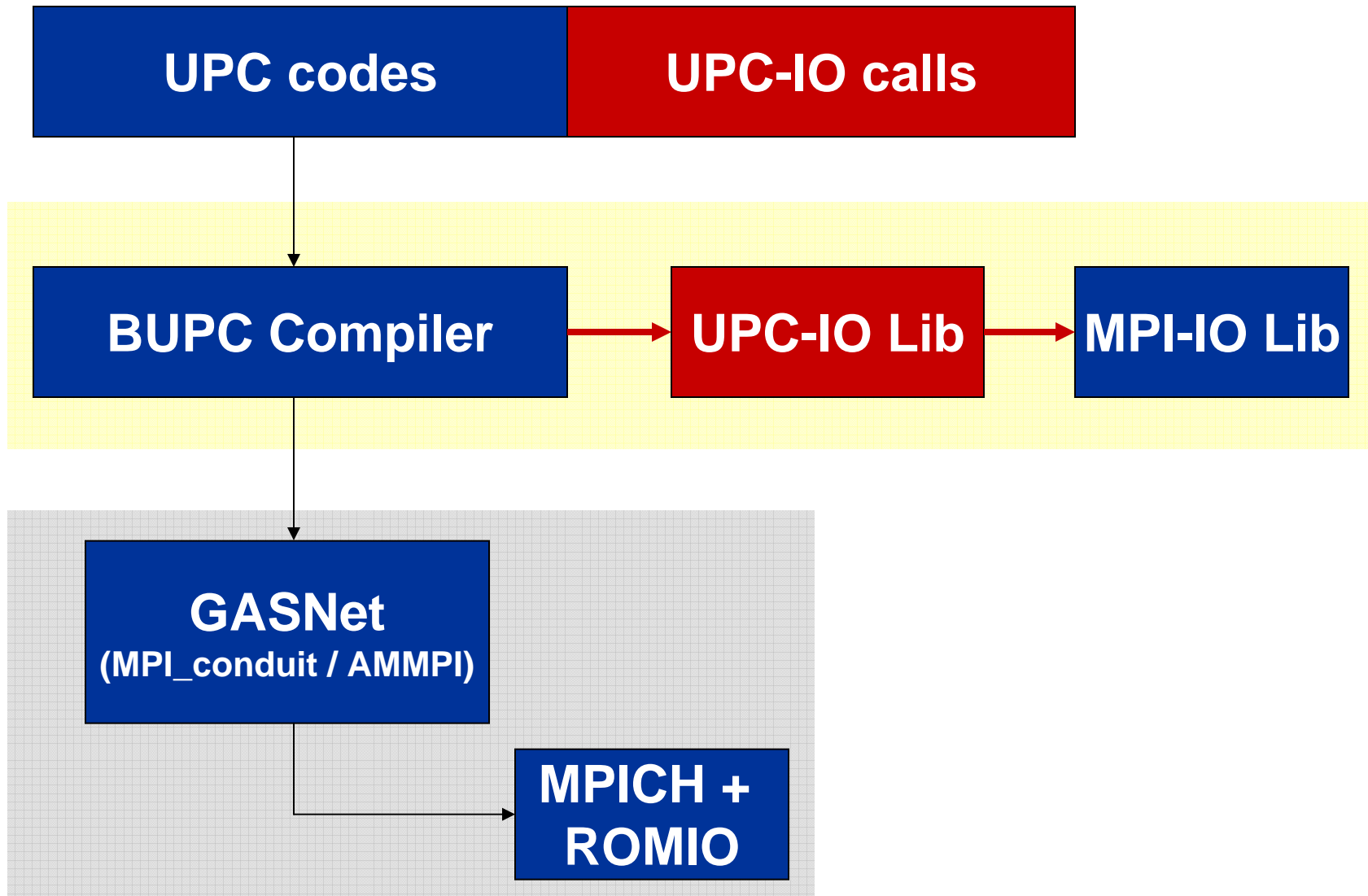
Long-Term Plan

UPC-IO

UPC-ADIO

File Systems

Our First Implementation



The First Implementation Working Environment

- ◆ Targeted the Cluster platform
- ◆ UPC-IO library
- ◆ MPICH v1.2.6 with ROMIO
- ◆ Berkeley UPC compiler v1.1.0 using MPI-conduit

Progress Status (I)

- ◆ **UPC-IO Functions fully coded, testing in progress**

Open/Close:

upc_all_fopen, upc_all_fclose

Functional / Misc.:

upc_all_fsync,, upc_all_fseek, upc_all_fset_size, upc_all_fget_size,
upc_all_fpreallocate, upc_fcntl, upc_all_fwait_async,
upc_all_ftest_async

Progress Status (II)

Blocking Read/Write:

upc_all_fread_local, upc_all_fread_shared, upc_all_fwrite_local,
upc_all_fwrite_shared

Blocking List-IO:

upc_all_fread_list_local, upc_all_fread_list_shared,
upc_all_fwrite_list_local, upc_all_fwrite_list_shared

Non-Blocking Read/Write:

upc_all_fread_local_async, upc_all_fwrite_local_async,
upc_all_fread_shared_async, upc_all_fwrite_shared_async

Progress Status (III)

- ◆ **A number of UPC specified constants, data types and constructs have been added**
upc_file_t, upc_off_t, ...

To do list : Short-term

- ◆ `errno`
- ◆ `hints`
- ◆ `sync_mode`
- ◆ **Non-Blocking List-IO functions**
- ◆ **Testing and benchmarking**