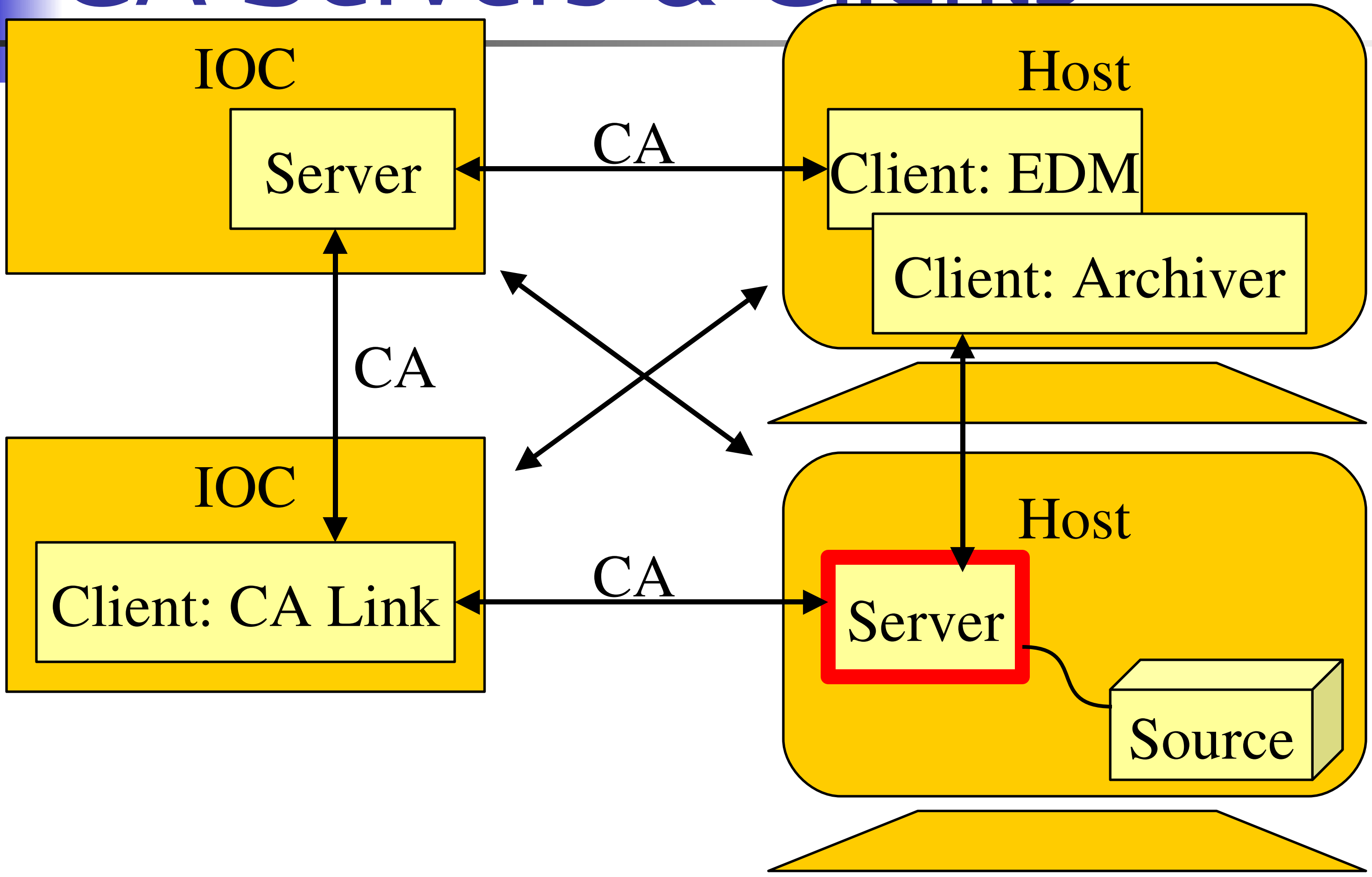
Channel Access Server Tool

Developers Training

Jeff Hill, Kay-Uwe Kasemir,
LANL

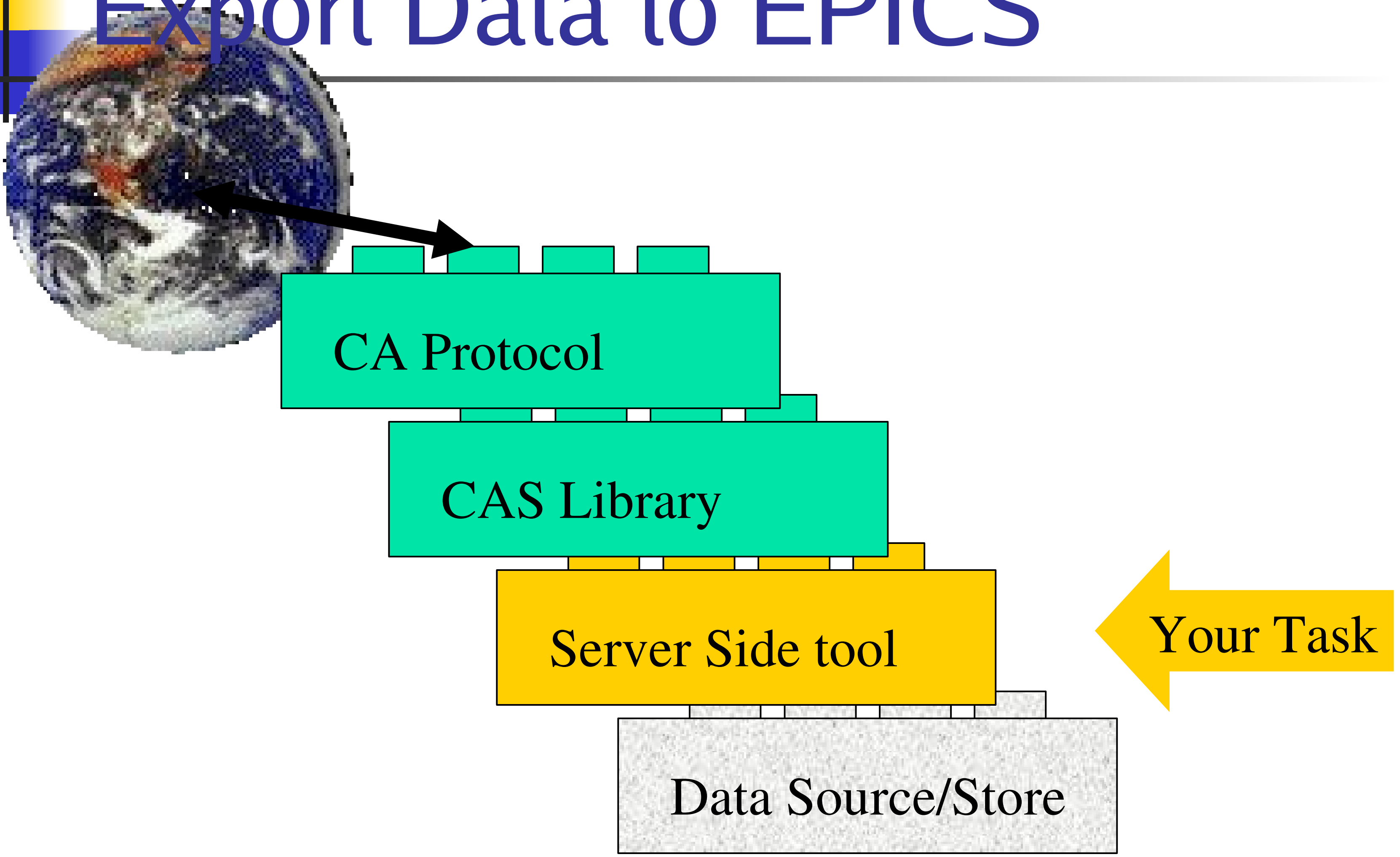
CA Servers & Clients



CA Server Library: CAS

- C++ library for WIN32, Solaris, Linux, ...
- Part of EPICS/base/...:
  - Include: include/casdef.h
  - Library: lib/<arch>/cas.a, cas.lib, ...
  - Sources: src/cas/…
  - Examples: src/cas/example
- Manual: http://www.aps.anl.gov/epics/,
  follow Other Sites, LANL, Tools, Channel Access

Export Data to EPICS



CAS Library API

- Four Classes
  - Server - “caServer”
  - Process variable - “casPV”
  - Channel (optional) - “casChannel”
  - Asynchronous IO (optional) - “casAsyncXxxIO”
- Override virtual methods
- Uses GDD class (Gen. Data Descriptor) for portable data handling
- Driven by EPICS fdManager

Server Tool Responsibilities

- Respond to PV existence test requests:
  override caServer::pvExistsTest
- Attach client to named PV:
  override caServer::createPV
- Process PV read requests:
  override casPV::read
- Process PV write requests:
  override casPV::write
- Notify server library when PV changes:
  call casPV::postEvent

GDD

- Reference counted
  - Allocate dynamically
  - Add/delete reference, removes itself when no longer referenced
- Three types of GDDs
  - Scalar
  - Vector (Atomic)
  - Container (e.g. value + time stamp + limits)
- Characterized by
  - primitive type: integer, float., ...
  - application: value, time, limits, units …
- gddAppFuncTable.h
  Helper class to dispatch read requests by application, also for containers

Example:

- Extremely Simple CA Server

- <EPICS base>/src/cas/example/simple
- more in <EPICS base>/src/cas/example

Caveats

- There is no EPICS database at work!
  Your server tools decides what channels to serve.
- CAS helps by handling not only DBR_DOUBLE but also e.g. DBR_CTRL_DOUBLE requests. If you fill those container requests, clients can see the control limits, units, etc.
- BUT: If you serve “fred”, there is no “fred.VAL” nor “fred.HIHI” unless you serve that, too, as separate PVs.

Advanced “caServer”

- Optional virtual member functions
  - show server tool state: watch clients attach..
- Ordinary member functions
  - register new event type

Advanced “casPV”

- Optional virtual member function
  - maximum matrix dimension and bounds
  - client interest (event subscription) notification
  - begin / end transaction notification
  - no clients attached to PV “destroy” hint
  - create channel (for access security)
  - show

Asynchronous IO

- The server tool should *not* block when completing a client initiated request
- Currently four IO operations can be completed asynchronously
  - PV read
  - PV write
  - PV exist test
  - PV attach

Completing IO Asynchronously

- Create appropriate asynchronous IO object
- Return S_casApp_asyncCompletion
- When the IO completes
  - call asynchronous IO object’s “postIOCompletion()”