

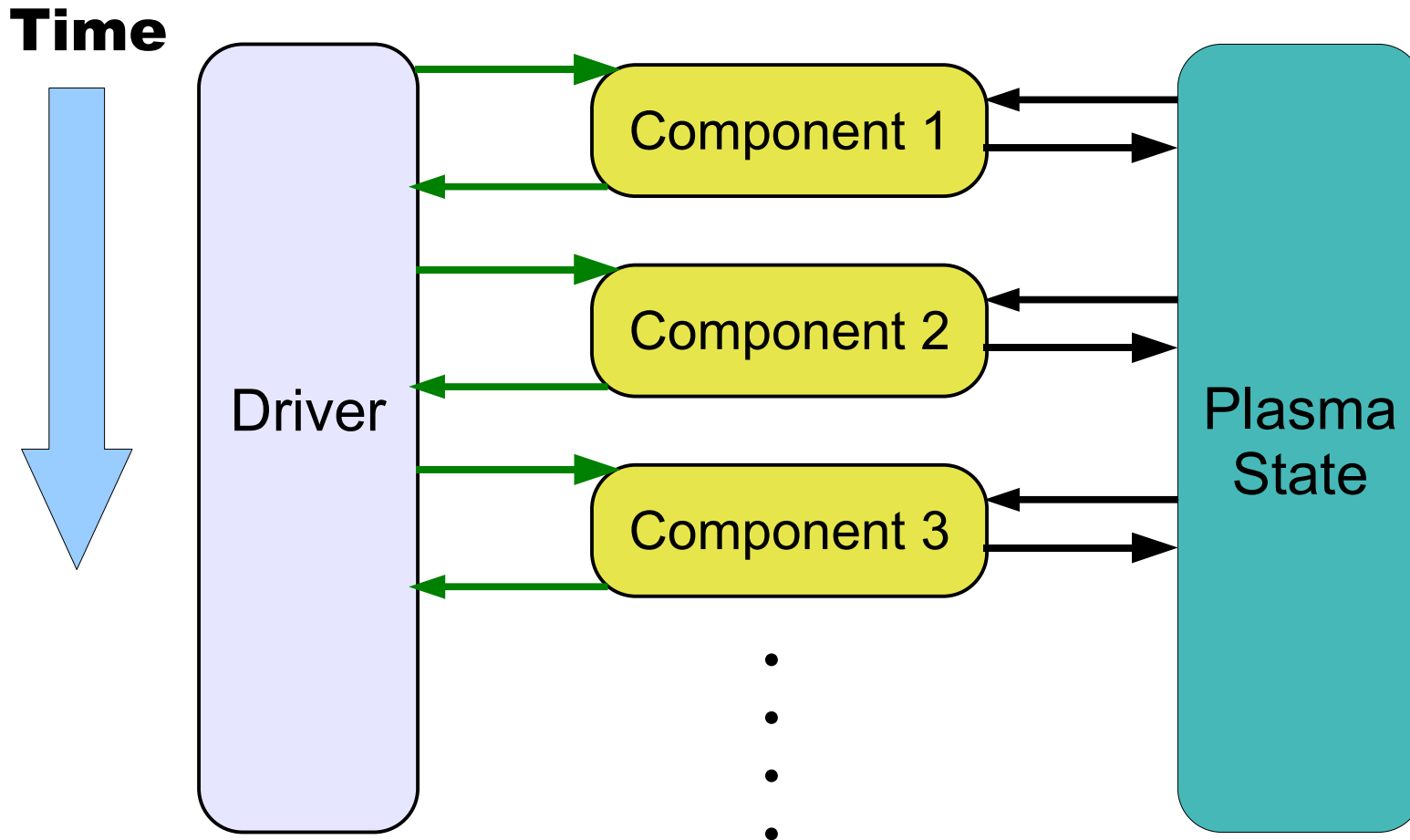
IPS – The Next Generation

How I Learned to Stop Worrying and Love Concurrency

Wael R. Elwasif
ORNL

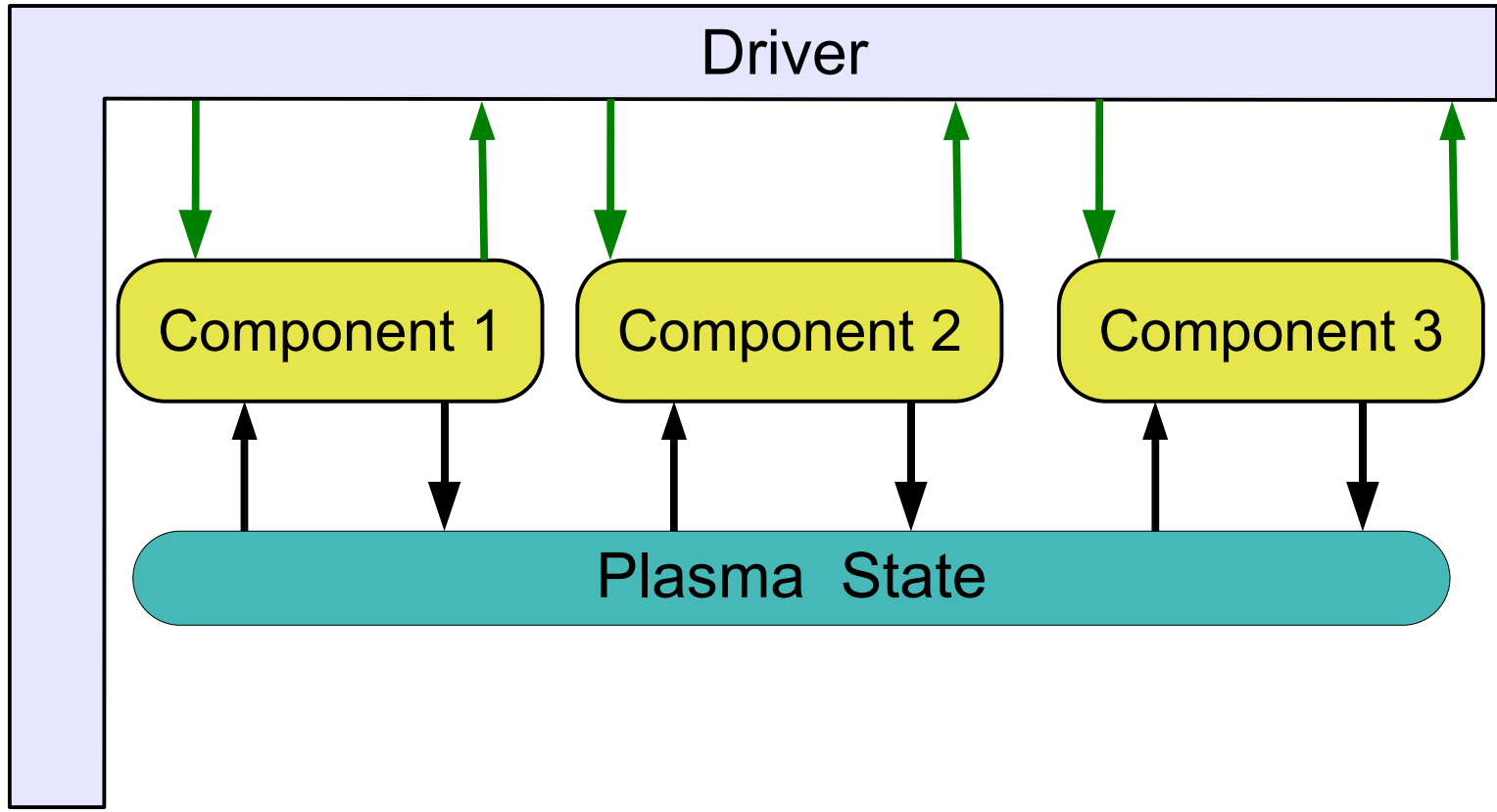
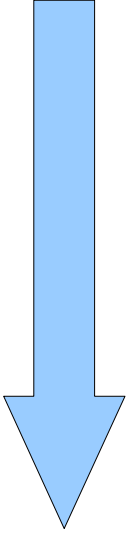
Samantha Foley
IU

The Current IPS Execution Model



Concurrent IPS Execution Model

Time



State Access Consideration

- Sharing the Plasma State:
 - How to define and resolve “Simultaneous writes”?
- Cached State Coherency Policies
 - Do we update the cached version when the master changes?
 - How do we notify a running component that its local state has changed?.
 - Does the component care?
- What locking/unlocking semantics do we need/use?

Inter-component Communication

- Is concurrent state sharing enough ?
- If not, then we'll need Communication:
 - Running Fortran Binary **TO *Sender*** Component wrapper **TO *Receiver*** Component Wrapper (**VIA** the Framework) **TO** Running Fortran Binary.
 - Communication between a running binary and its component wrapper is component-specific.
- Is data communication enough, or do we need direct method invocation?

Execution Environment

- Multiple instances of the same component running simultaneously, using different configurations?
- Multiple simulations running “out of phase” using the same set of components.
- Failure and controlled termination semantics.
- Static/Dynamic resource management.

What About Data Management?

- Do we need a different, more robust data manager for the concurrent IPS?
 - (Probably YES).
- Things to consider:
 - Directory layout
 - Structural limitations (one output set *per* component *per* time step.)
- Do we need SWIM-specific data analysis infrastructure?