DaFlEx Progress report

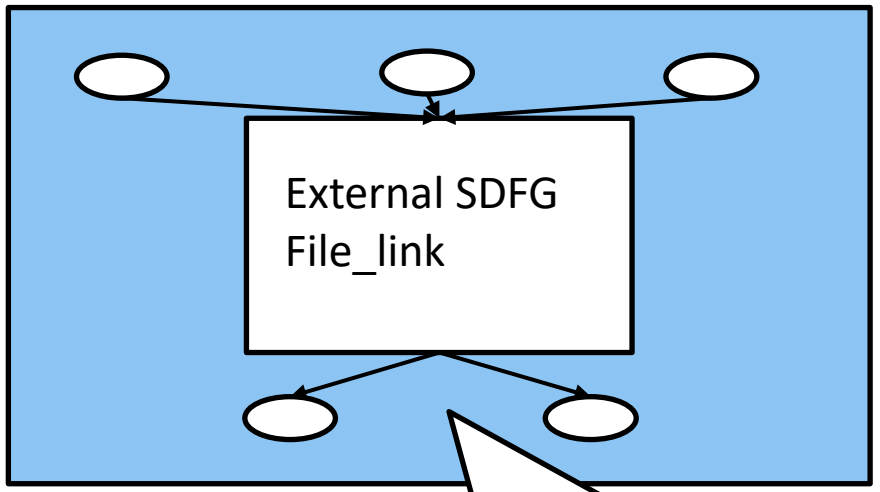
External nested SDFGs – Lex

```
if (direction_switch) then
    !x-direction first
    call semi_discrete_step( state , state     , state_tmp , dt3 , DIR_X , flux , tend ,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int)
    call semi_discrete_step( state , state_tmp , state_tmp , dt2 , DIR_X , flux , tend,hy_dens_cell,hy_dens_theta_cell ,hy_dens_int,hy_dens_theta_int,hy_pressure_int)
    call semi_discrete_step( state , state_tmp , state     , dt1 , DIR_X , flux , tend ,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int)
    !z-direction second
    call semi_discrete_step( state , state     , state_tmp , dt3 , DIR_Z , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    call semi_discrete_step( state , state_tmp , state_tmp , dt2 , DIR_Z , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    call semi_discrete_step( state , state_tmp , state     , dt1 , DIR_Z , flux , tend ,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int)
  else
    !z-direction second
    call semi_discrete_step( state , state     , state_tmp , dt3 , DIR_Z , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    call semi_discrete_step( state , state_tmp , state_tmp , dt2 , DIR_Z , flux , tend,hy_dens_cell,hy_dens_theta_cell ,hy_dens_int,hy_dens_theta_int,hy_pressure_int)
    call semi_discrete_step( state , state_tmp , state     , dt1 , DIR_Z , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    !x-direction first
    call semi_discrete_step( state , state     , state_tmp , dt3 , DIR_X , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    call semi_discrete_step( state , state_tmp , state_tmp , dt2 , DIR_X , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
    call semi_discrete_step( state , state_tmp , state     , dt1 , DIR_X , flux , tend,hy_dens_cell,hy_dens_theta_cell,hy_dens_int,hy_dens_theta_int,hy_pressure_int )
  endif
```

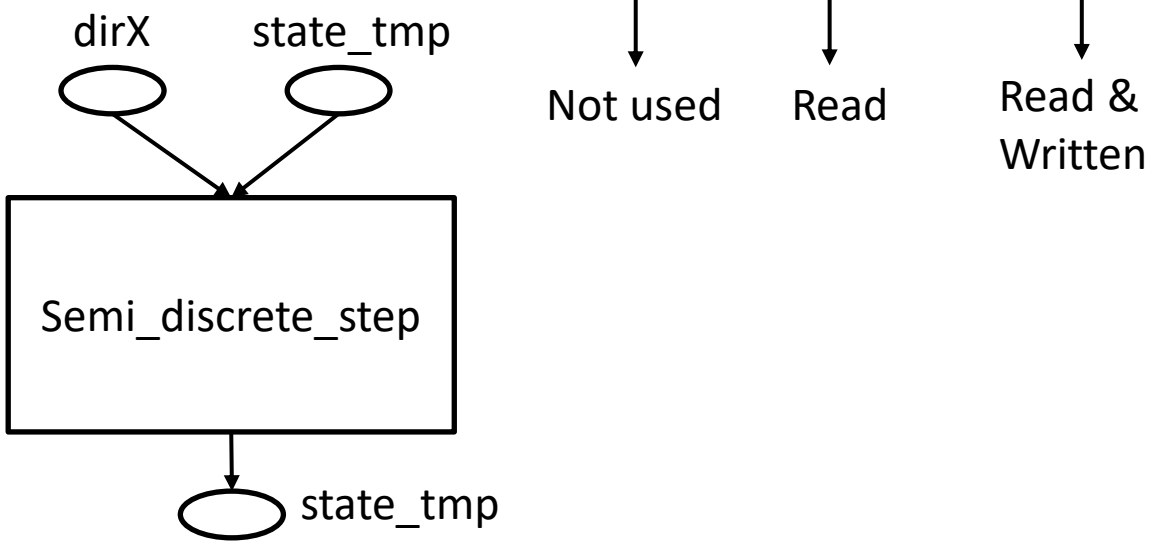
These each call 4 more functions

External nested SDFGs – Lex

- **Goal – New workflow:**
  - create SDFGs for each function first
  - do local optimization
  - load them together (potentially hierarchically)
  - do global optimization




```
call semi_discrete_step( state , dirX , state_tmp)
```



"Slotting" the external SDFG in is not necessarily trivial:
What if the NestedSDFG was simplified and no longer uses all arguments?
We can leverage the lessons of the frontends!

ICON and Cloverleaf

- Adding more Fortran features
- Increasing robustness