OpenMP Async Offload

OpenMP Task

Source Code :

#pragma omp task
    a = 10;

IL :

  call i32 @__kmpc_global_thread_num()
  call i8* @__kmpc_omp_task_alloc(…)
  call i32 @__kmpc_omp_task()

omp_task_entry :

      host code

OpenMP Target

Source Code :

#pragma omp target
    a = 10;

IL :

  call i32 @__tgt_target(…)
  br %omp_offload.failed, %omp_offload.cont"
 omp_offload.failed:
    call void @host_fallback()
omp_offload.cont:

OpenMP Target with depend

Source Code :

#pragma omp target depend (in : a)
    a = 10;

IL :
  call i8* @__kmpc_omp_task_alloc()
  call void @__kmpc_omp_wait_deps()
  call void @__kmpc_omp_task_begin_if0()
  call i32 @__tgt_target()
   br, %omp_offload.failed, %omp_offload.cont"
omp_offload.failed:
  call void @host_fallback()
omp_offload.cont:
  call void @__kmpc_omp_task_complete_if0()

OpenMP Target with nowait

Source Code :

#pragma omp target nowait
    a = 10;

IL :
 int32 flags =1   // to indicate this is a proxy task

  task = call i8* @__kmpc_omp_task_alloc(..   flags)
  call i32 @__tgt_target_nowait(.. task)
   br, %omp_offload.failed, %omp_offload.cont"
omp_offload.failed:
   call void @host_fallback()
omp_offload.cont:

libomptarget on target task completion calls :

__kmpc_proxy_task_completed_ooo(task)

OpenMP Target with nowait + depend

Source Code :

#pragma omp target nowait depend(in:a)
    a = 10;

IL :

```
int32 flags =1              //  to indicate this is a proxy task
task =  call i8* @__kmpc_omp_task_alloc(..    flags)
call i32 @__kmpc_omp_task_with_deps(  omp_task_entry)

omp_task_entry :
  call i32 @__tgt_target_nowait( ..  task)
  br, %omp_offload.failed, %omp_offload.cont"
omp_offload.failed:
  call void @host_fallback()
omp_offload.cont:
```

libomptarget on target task completion calls :

__kmpc_proxy_task_completed_ooo(task)