TROY

Tiered Resource OverlaY

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http://saga-project.github.com/troy/

1. Motivation / Use Cases
2. Conceptual Architecture
3. Implementation Architecture / Design
4. API, Code Example

Motivation for TROY

- provide uniform interface to pilot frameworks (PF)

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- support for application level scheduling across those PFs

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- scheduling compute node allocation & execution

Use Case (ii)

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- compute pilots on XSEDE and EGI

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Use Case (iii)

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- publish ;-)

TROY Placement and Scope

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  - application defines resource requirments
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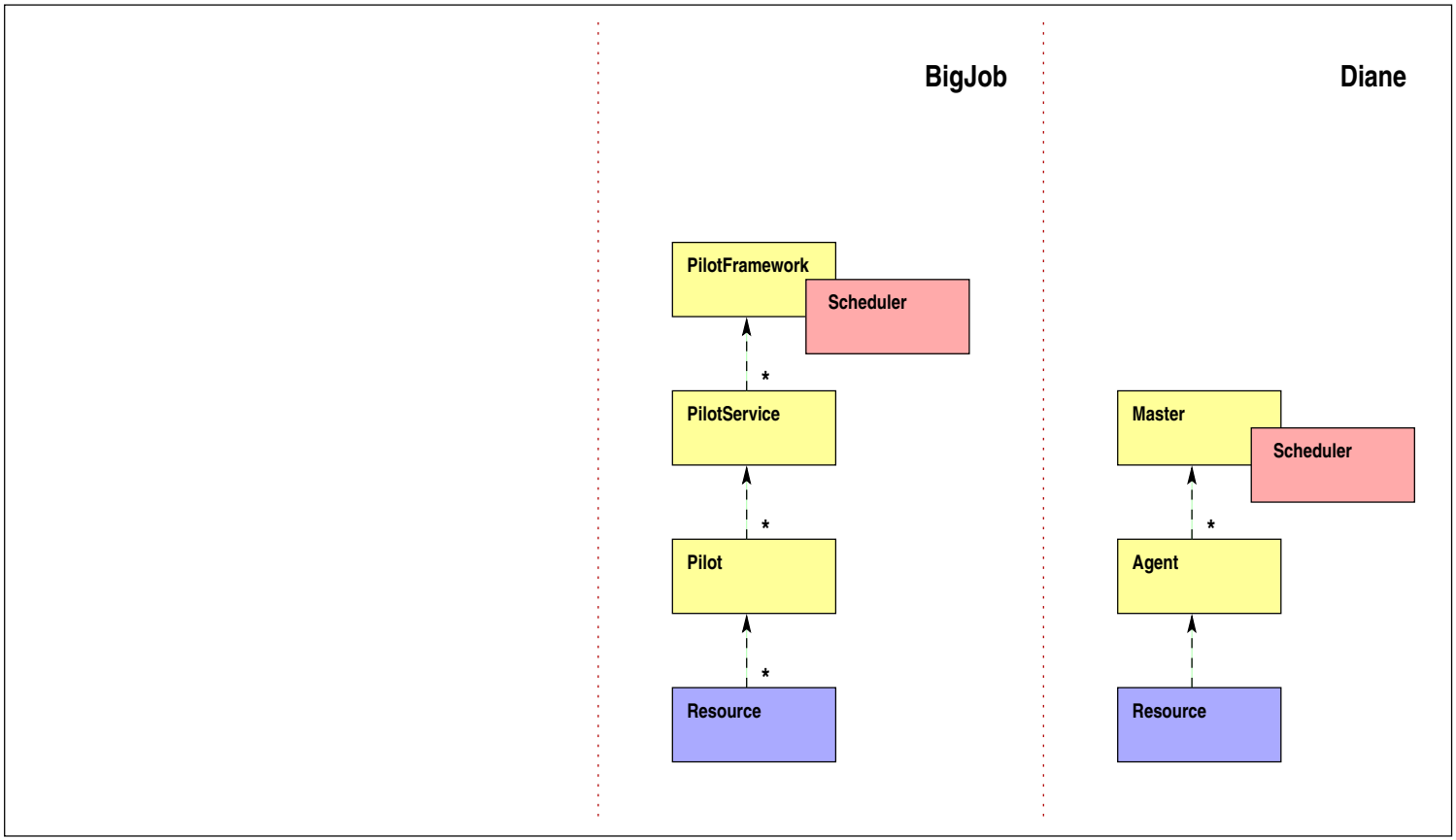
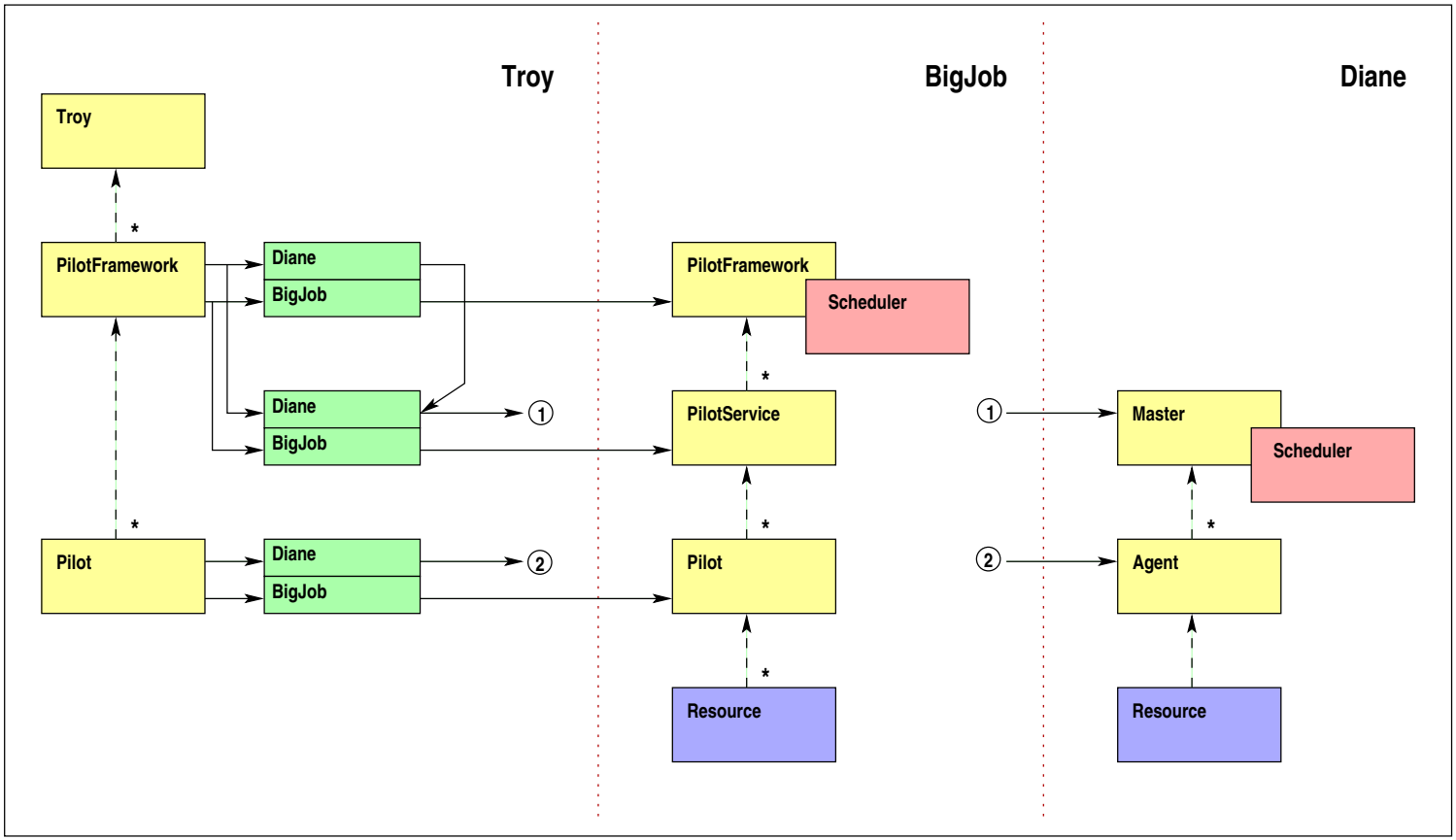
- is-a scheduling framework
  - hosts scheduling algorithms
  - interfaces to external schedulers
  - enacts scheduling decisions
- interface to pilot job frameworks
  - assumes P*, and possibly Pilot API

Architecture



Architecture



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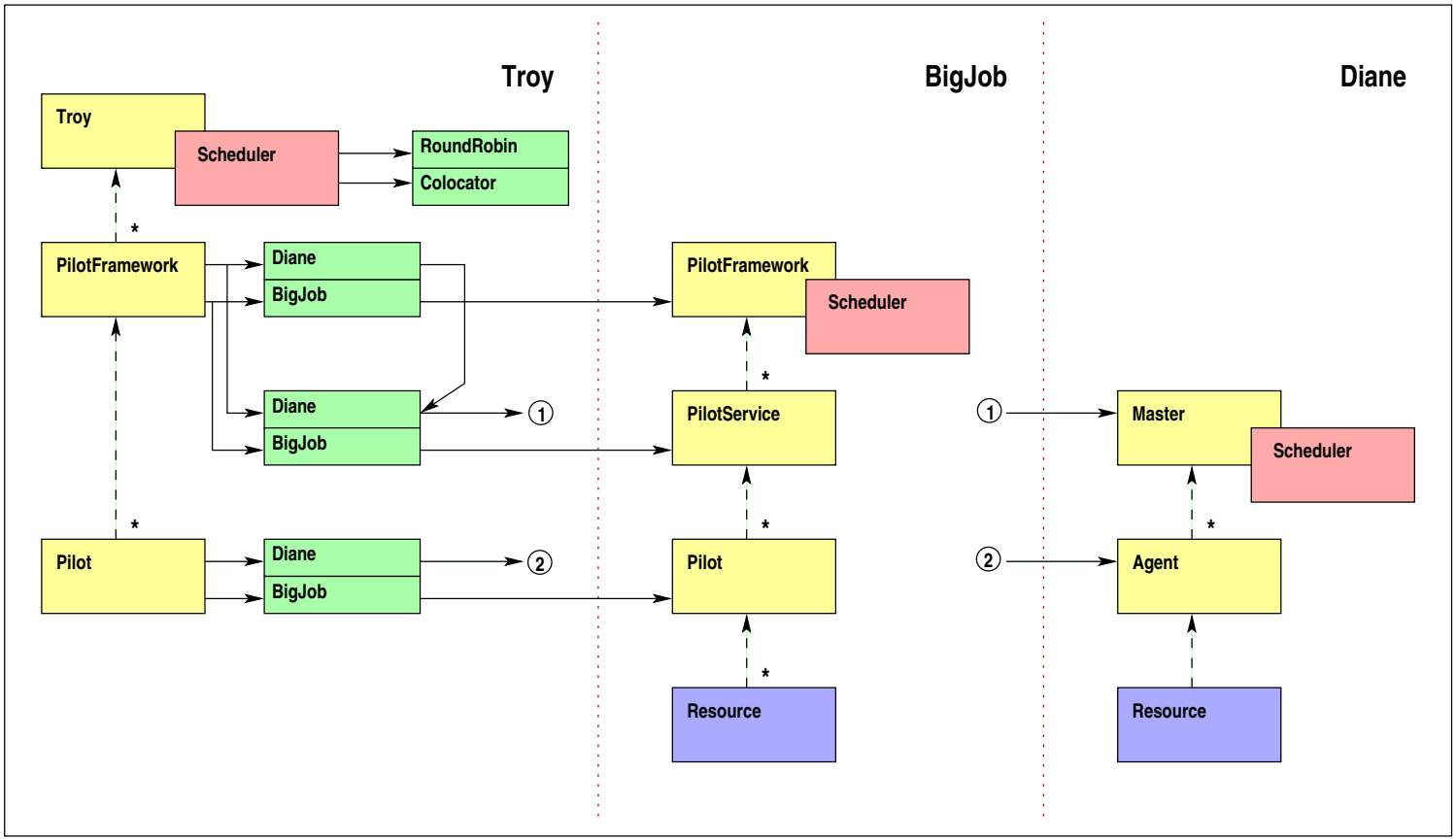

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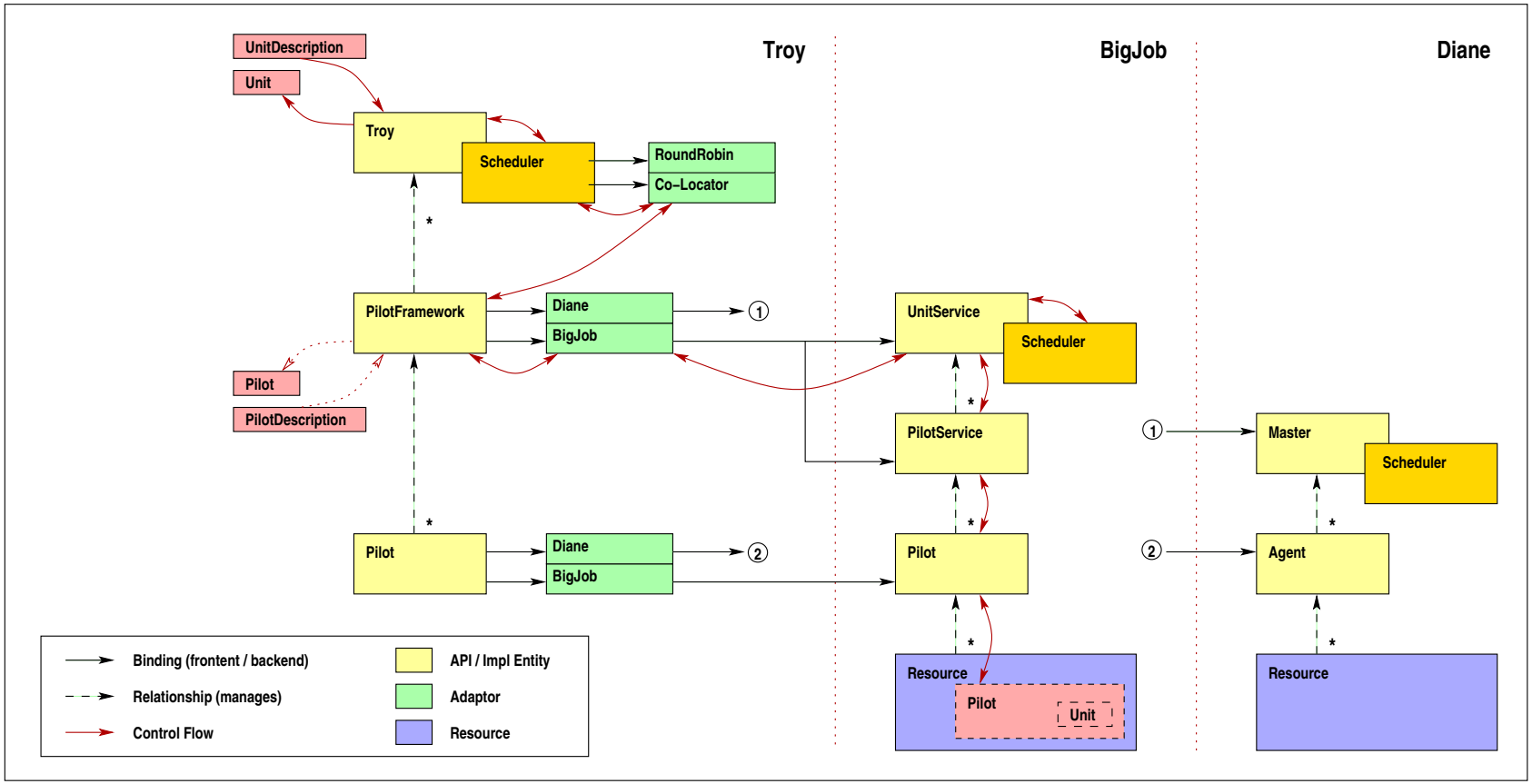

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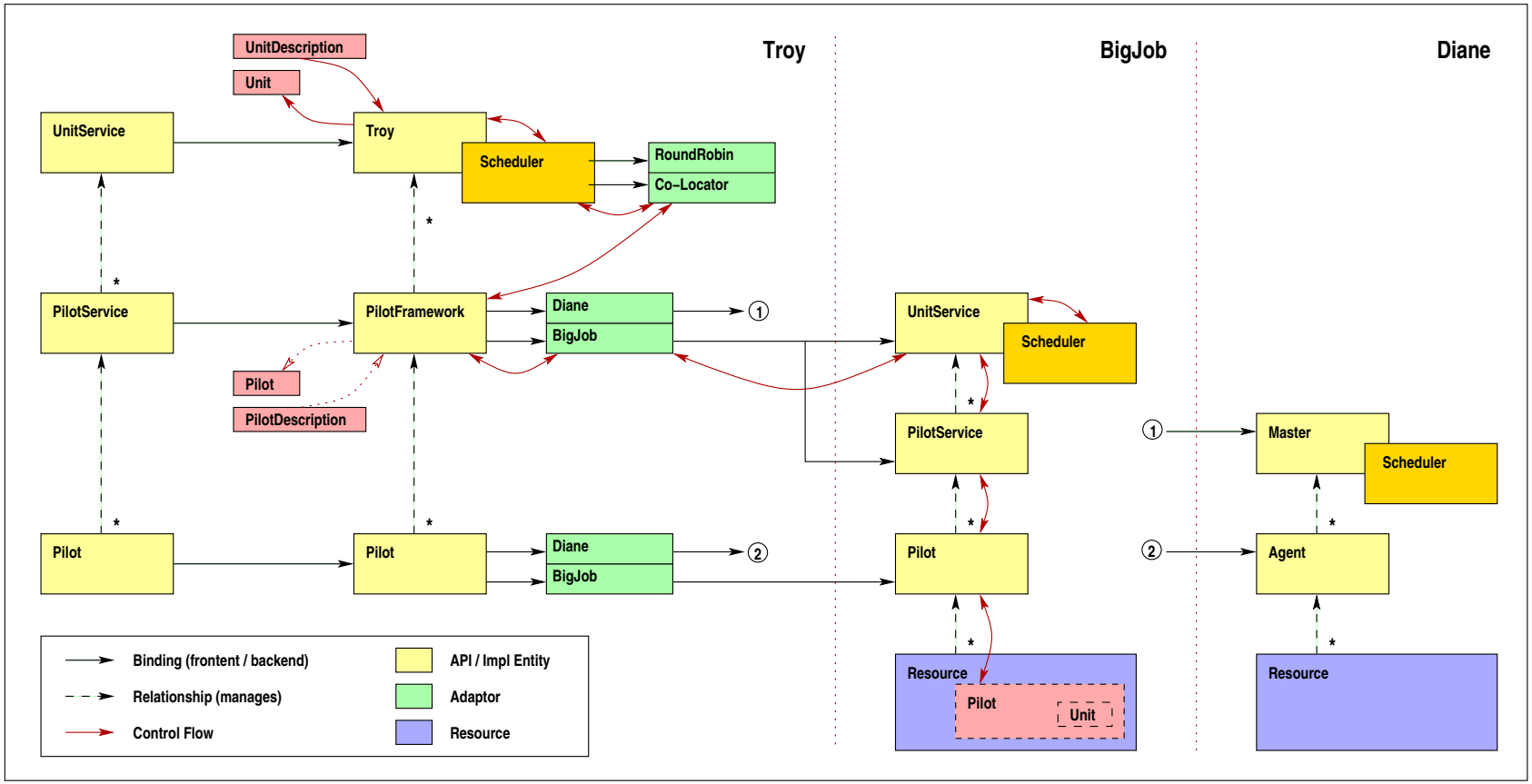

Troy API Classes

Troy classes interfacing to backend pilot systems:

- `troy.Scheduler`
- `troy.PilotFramework`
  interfaces to the `XXXUnitService` and `XXXPilotService` classes of Pilot API
- `troy.ComputePilot`
- `troy.ComputeUnit`
- `troy.DataPilot`
- `troy.DataUnit`

Troy API

API Example

```
pf1 = troy.PilotFramework ('bigjob//lonestar')
pf2 = troy.PilotFramework ('bigjob//kraken')

cpd  = troy.ComputePilotDescription ()
pf1.submit_pilot (cpd)
pf2.submit_pilot (cpd)

t    = troy.Troy ()
t.add_pilot_framework (pf1)
t.add_pilot_framework (pf2)

s    = troy.Scheduler ('Random')
t.add_scheduler       (s)
```

Troy API

API Example Cont.

```
cud = troy.ComputeUnitDescription ()

cud['executable'] = '/bin/sh'
cud['arguments']  = ['-c', 'touch /tmp/hello_troy_pj && sleep 10']

cu  = t.submit_unit (cud)
```

Troy API

API Example Cont.

```
while cu.state not in (troy.Done, troy.Failed) :

    print "? cu %s: %s"  %  (cu.id, cu.state)
    time.sleep (1)

print "! cu %s: %s"  %  (cu.id, cu.state)

pf1.cancel ()
pf2.cancel ()
```

Troy API

Scheduler

```
def my_scheduler (troy, ud) :

    pilots = []

    for pf_id in troy.list_pilot_frameworks () :
        pf = troy.PilotFramework (pf_id)

        for p_id in pf.list_pilots () :
            p = troy.ComputePilot (p_id)
            pilots.append (p)

    tgt = pilots[random.randint (0, len (pilots) - 1)]
    return tgt.submit_unit (ud)
```

Troy API

Scheduler Cont.

```
p   = pilots[random.randint (0, len  (pilots) - 1)]

return p.submit_unit (ud)
```

Troy API

API Example + Scheduler

```
t   = troy.Troy ()
pf  = troy.PilotFramework ('bigjob//')
t.add_pilot_framework (pf)

s   = troy.Scheduler ('Random')
t.add_scheduler (s)

cpd  = troy.ComputePilotDescription ()
cp1  = pf.submit_pilot (cpd)
cp2  = pf.submit_pilot (cpd)
```

Troy API

API Example + Scheduler

```
t   = troy.Troy ()
pf  = troy.PilotFramework ('bigjob//')
t.add_pilot_framework (pf)


t.add_scheduler (my_scheduler)

cpd  = troy.ComputePilotDescription ()
cp1  = pf.submit_pilot (cpd)
cp2  = pf.submit_pilot (cpd)
```