Collector Tour

EU HTCondor Workshop 2023

Jaime Frey

Collector Defines an HTCondor Pool

› Single fixed location in the network

› Collects information about the pool
  - Receives ClassAds of entities within the pool

› Decides who can participate in the pool
  - Who can advertise and who can query

› To join the pool, a daemon must…
  - Know the network location of the collector
  - Gain the trust of the collector

Layout of a General HTCondor Pool
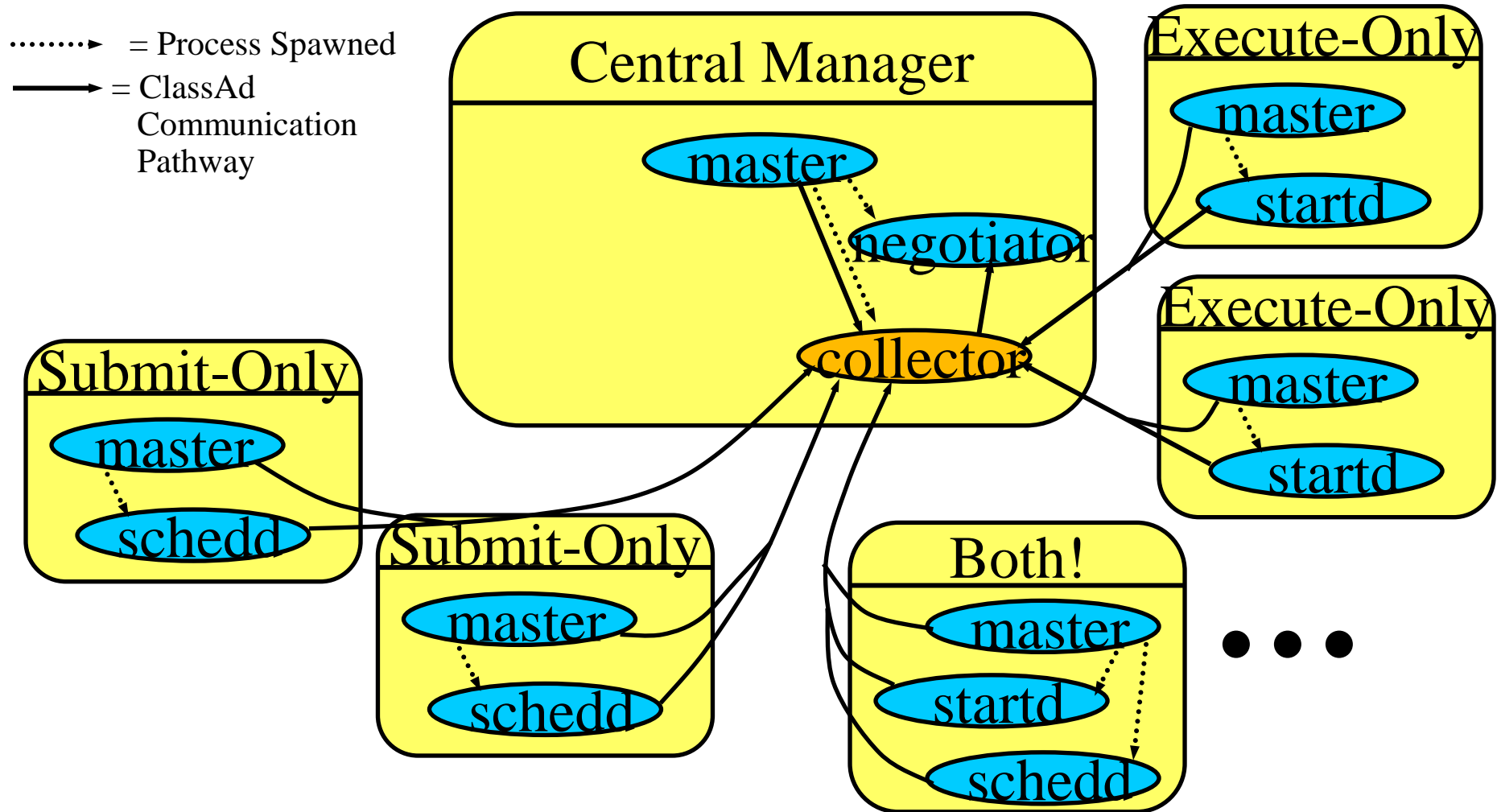
Roles of the Collector

› Root of all trust
  - Daemons and tools don't need preexisting trust with each other
  - Just trust in the collector

› Enabler of operations
  - Matchmaking
  - Pool administration
  - Network firewall traversal

› Monitoring
  - Collector contains data on pool activity and health

Collector is Stateless (mostly)

› Daemons send regular updates of ads

› Collector removes ads with no recent update

› If a daemon, crashes, it is dropped from the pool automatically

› If the collector restarts, full data of pool is re-established after a short period

Slot Ads

› Sent by condor_startd

› Default output of condor_status

› Multiple ads per EP

- Coming soon: new startd ad type for whole EP

› Used for matchmaking

› Shows available resources

› Shows details of running job, if any

Submitter Ads

› Sent by condor_schedd

› One per owner/group with queued jobs

› Used by negotiator to know who has jobs that need matching

› Shows totals of idle, running, held jobs

Schedd Ads

› Sent by condor_schedd

› Stats on schedd activity and health

- RecentDaemonCoreDutyCycle is most useful stat
- Totals of jobs in various states
- Totals of file transfers both queued and active

Master Ads

› Sent by condor_master

› Shows basic machine information, daemon status

› Locate master to send on/off/restart/reconfig commands

Accounting Ads

› Sent by condor_negotiator

› Resource usage and limit info for all users/groups

› Used to decide how to distribute pool's resources

Grid Ads

› Sent by condor_gridmanager

› One per <user, remote scheduler> for grid universe

› Shows job totals

› Shows problems communicating with remote scheduler

Collector Ads

› Sent by condor_collector
  - Sent to itself and potentially other collectors
› Stats on collector activity and health
  - RecentDaemonCoreDutyCycle is most useful stat
  - Totals of ads received
  - Stats of CCB activity

Generic Ads

› Create new ad types with condor_advertise

- ```
% condor_advertise UPDATE_AD_GENERIC - << EOF
? MyType="Bar"
? Name="Me"
? Abc=14
? EOF
Sent 1 of 1 ad to nenya.lan:9619.
% condor_status -subsystem Bar
MyType   TargetType   Name
Bar   None   Me
```

# Authentication Levels

› DAEMON

  • Collector, Generic, Grid

› ADVERTISE_MASTER (default DAEMON)

  • Master

› ADVERTISE_SCHEDD (default DAEMON)

  • Schedd, Submitter

› ADVERTISE_MASTER (default DAEMON)

  • Master

› NEGOTIATOR

  • Negotiator, Accounting

# Condor Connection Broker (CCB)

› Allows EPs behind a firewall to join a public pool

› TCP connections to EP are reversed

  • Collector used as a control channel

› Limitations

  • Collector and AP must be on public internet

  • Firewall must allow outbound connections

CENTER FOR
HIGH THROUGHPUT
COMPUTING

HTCondor

# CCB: Condor Connection Broker
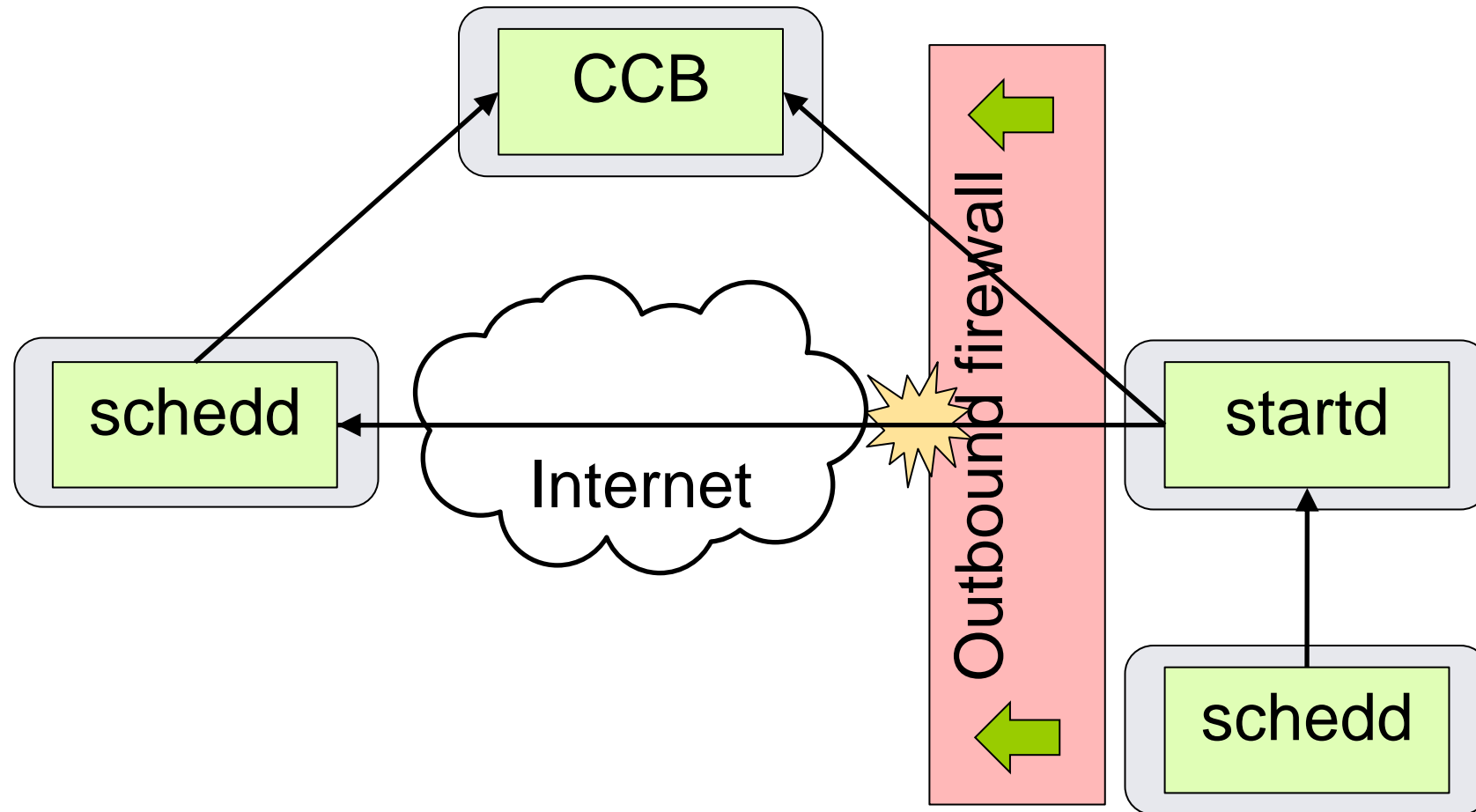
# High Availability

› Set of primary collectors

› Advertisers send to all collectors

› Queriers consult collectors in series

  • Avoid unresponsive collectors in future

# Spreading the Load

› Create secondary collectors to handle some duties

› Collector dedicated to CCB

› View collector

- Primary collector forwards updates to view collector
- Monitoring queries directed to view collector

# Offline Ads

› When an EP hibernates, it marks its ads as Offline

› Offline ads don't expire

› Offline ads are saved to disk and restored on a collector restart

› Considered for matchmaking

# Absent Ads

› When an EP stops updating, collector can mark its slot ads as Absent

› Absent ads only expire after a month

› Absent ads are saved to disk and restored on a collector restart

› Hidden from queries unless -absent is requested

# IDTOKENS to secure a pool

The key to a secure pool is to only allow trusted (authenticated and authorized) startds and schedds to advertise into the collector.
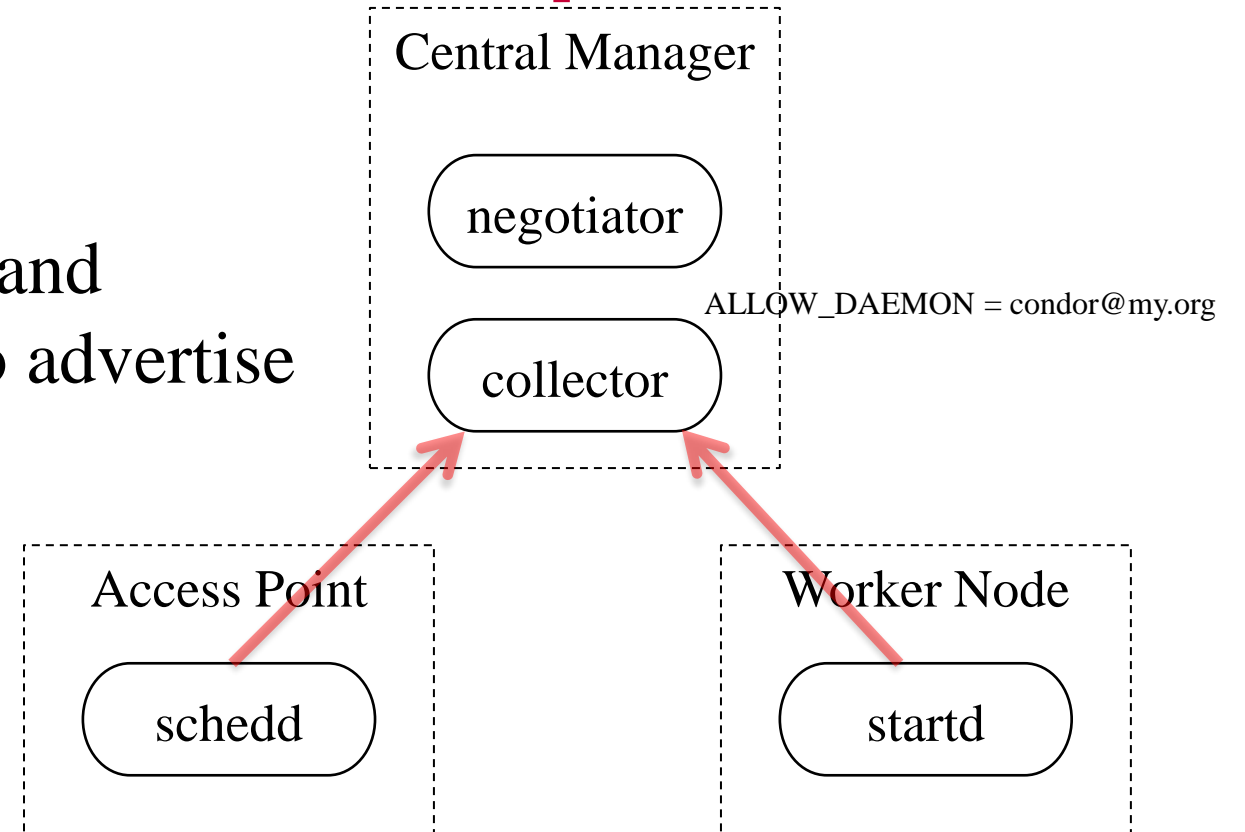
# IDTOKENS to secure a pool

› 1. Create a signing key file on the central manager

- A random key will be created by default at collector startup, or explicitly create with tool:
  <span style="color:red">condor_store_cred add -c</span>
- Signing key is stored by default in file
  <span style="color:red">/etc/condor/passwords.d/POOL</span>
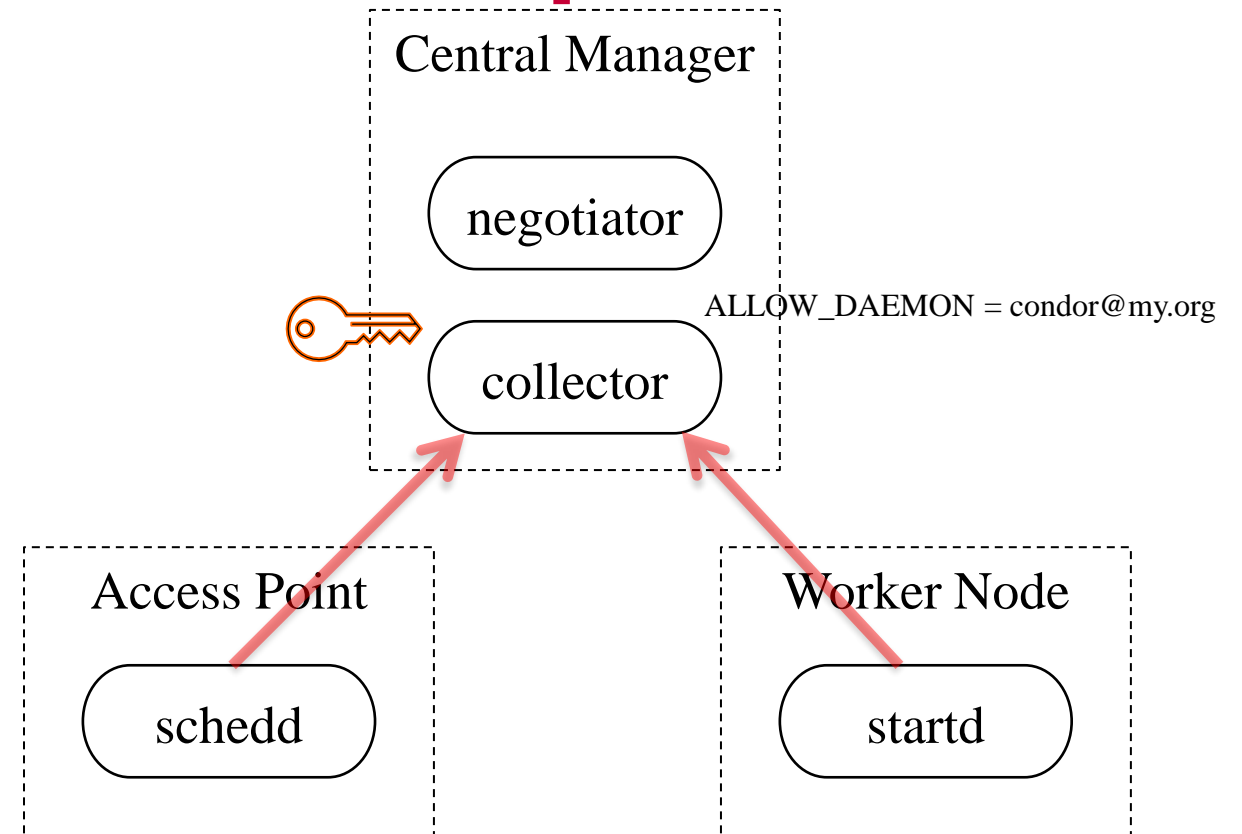
**Central Manager**

negotiator

ALLOW_DAEMON = condor@my.org

collector

**Access Point**

schedd

**Worker Node**

startd

CENTER FOR HIGH THROUGHPUT COMPUTING

HTCondor

# IDTOKENS to secure a pool

› 1. Create a signing key file on the central manager

› 2. Create an IDTOKEN file with identity "condor" on central manager

- Use tool
  condor_token_create -identity condor@cm.myorg

### Central Manager

negotiator

ALLOW_DAEMON = condor@my.org

collector

### Access Point

schedd

### Worker Node

startd
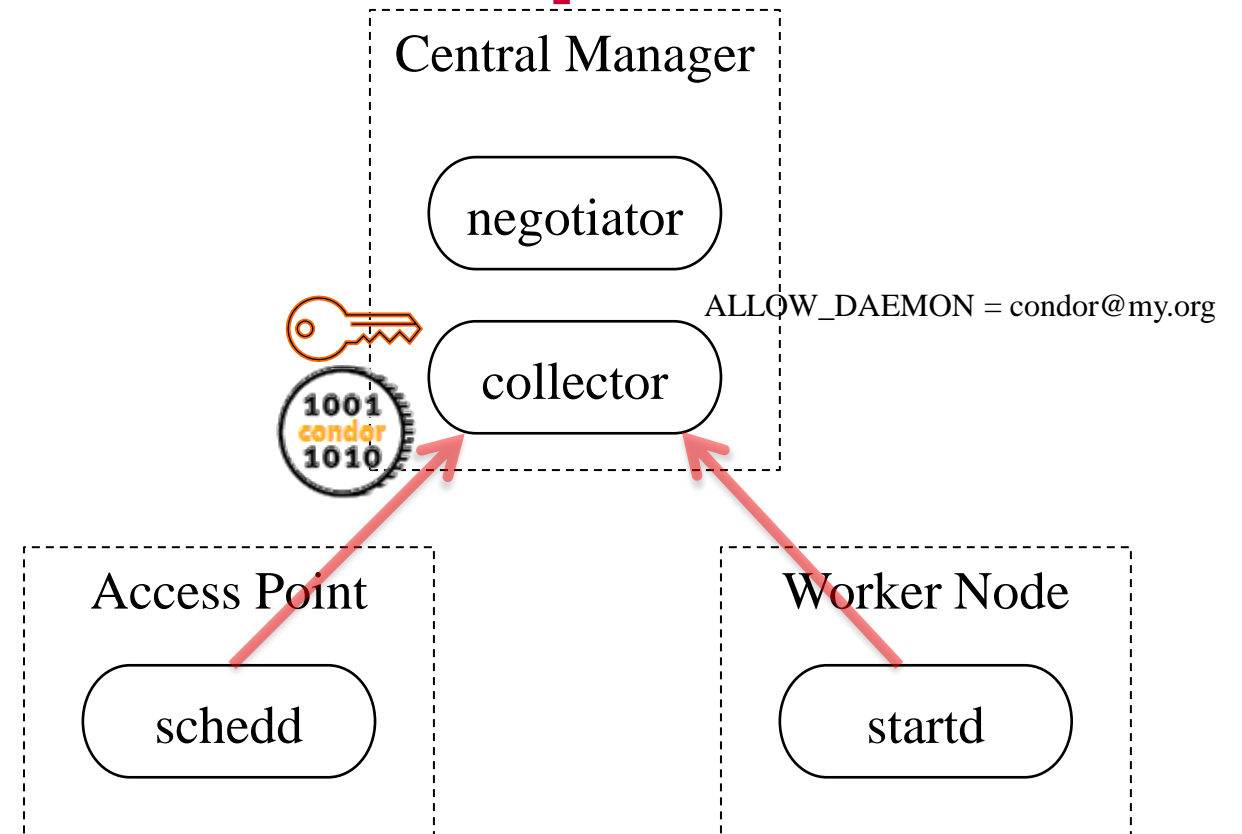
# IDTOKENS to secure a pool

› 1. Create a signing key file on the central manager

› 2. Create an IDTOKEN file with identity "condor" on central manager
- Use tool
  condor_token_create -identity condor@cm.myorg

› 3. Copy this IDTOKEN file to each trusted server you want to join your pool
- Place file into directory /etc/condor/tokens.d

**Central Manager**

negotiator

ALLOW_DAEMON = condor@my.org

collector

1001 condor 1010

**Access Point**

schedd

1001 condor 1010

**Worker Node**

startd

1001 condor 1010

CENTER FOR HIGH THROUGHPUT COMPUTING

HTCondor
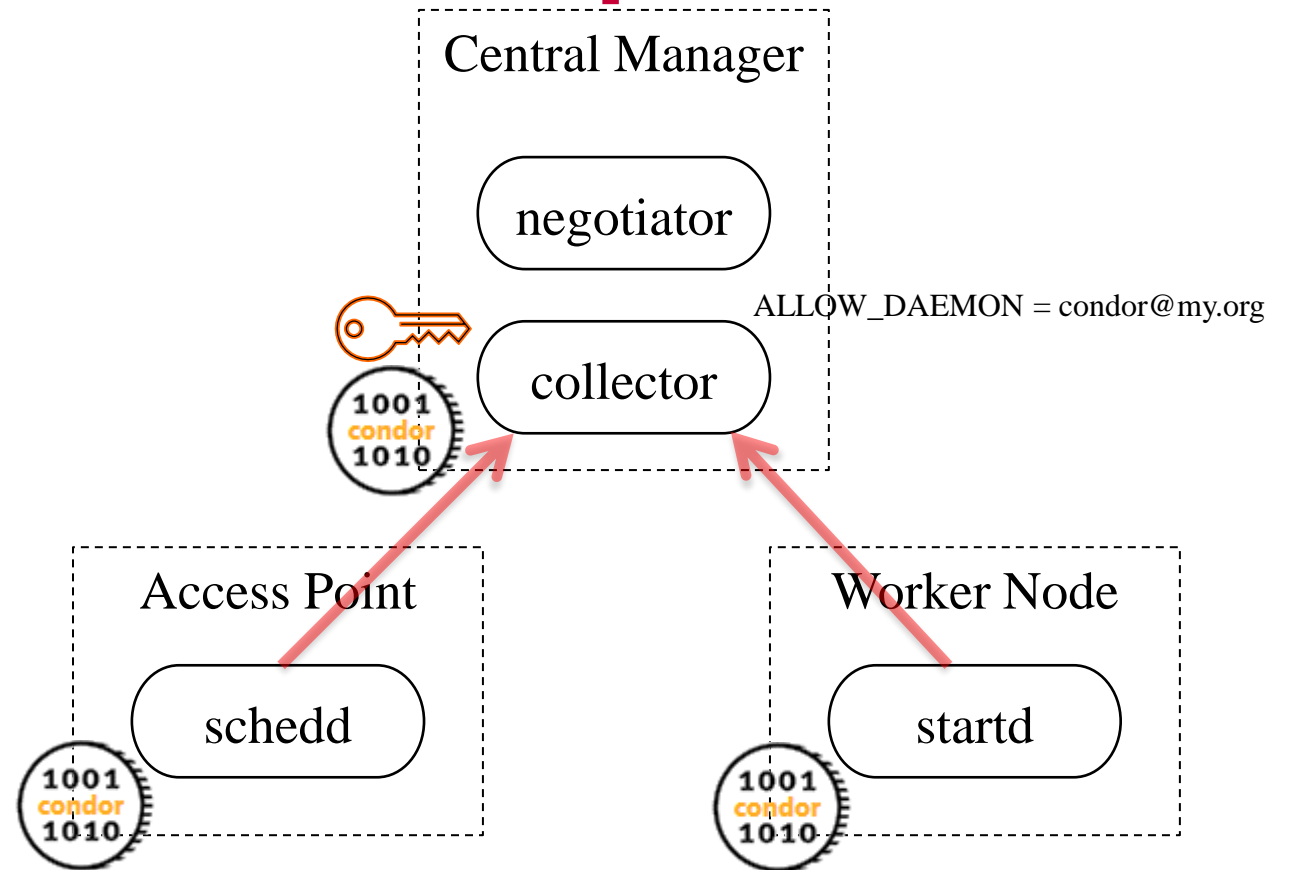
# Daemon Capabilities

› Daemons include a capability when advertising to the collector
  - Similar to a token, but in-memory and daemon-specific
  - Anyone possessing the capability can issue commands to the daemon

› Collector will give capability to trusted queriers

› Allows daemons to communicate with no preexisting trust
  - Trust is vested in the collector

# Daemon Capabilities

› During matchmaking
  - Negotiator receives capabilities for schedds and startds
  - Negotiator sends startd capability to schedd for each match

› Admin tools
  - Tool receives capabilities for daemons it will act on

# Thank You!

**PARTNERSHIP to ADVANCE THROUGHPUT COMPUTING**

CENTER FOR HIGH THROUGHPUT COMPUTING

HTCondor