

# Dychron and HTCondor

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# Dychron

and HTCondor

- Introduction to Dychron
- The Compute Market
- Creating an Intuitive Interface
- Future Developments

# **Dychron** and HTCondor

## Introduction to Dychron

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The Compute Market

# Dychron and HTCondor

## A bit about Dychron

- Dychron was founded to advance an alternate view of resource acquisition for high-throughput computing.
- We believe cycle stealing works, and that soon after the resources of the campus(es) have been fully utilized, there's no reason not to take that method off campus.
- This means 1) the creation of a community of providers of spare cycles 2) engaging that community and 3) inciting people to join that community.

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Introduction to Dychron

# Dychron and HTCondor

## Volunteer Computing Successes

- Folding@Home (the largest volunteer project) has a capacity of 12 petaFLOPS provided by 199,076 volunteers.
- As a result of the cycles scavenged from ordinary home users, Pande Lab at Stanford has produced 109 papers directly attributable to Folding.
- Folding produces a compute century of work every 4.4 hours.

# Dychron and HTCondor

## How to provide incentives

- Dychron is a software company, but its founders have finance and economics backgrounds.
- Our initial introduction to Condor was a way to enable quick analysis of the commodities markets.
- Unfortunately, there was no Commodities@Home...

# Dychron and HTCondor

## Market-based Resource Acquisition

- Folding relied on altruism to develop its computing power.
- This may work in certain circumstances, but won't in others.
- Your project and its eventual capacity is determined by how well you can market your idea.
- There's also a significant delay in the time it takes to develop a volunteer computing project, and the time it can be depended upon to provide cycles.

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The Compute Market

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## Market-based Resource Acquisition

- Our proposal is to appeal to computer users' more self-interested nature.
- We've created a web portal so that these computer users can offer their computer time for sale, and so that researchers can purchase it in a free and fair marketplace (this is very important)
- This model works too. The capacity of the bitcoin network is estimated to be 936 petaFLOPS.

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The Compute Market

# Dychron and HTCondor

## How does this whole thing work?

- We run `condor_startds` on a client that we distribute to our users.
- These connect to our network of cloud hosted, autoscaled, load balanced central managers via a... VPN.
- We're launching a beta next week to test the system. We're looking for potential beta testers both to provide their cycles and to test to see if their programs work.

# **Dychron** and HTCondor

## Creating an Intuitive Interface

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Creating an Intuitive Interface

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## Balancing Flexibility with Ease-of-Use

- The big (and ongoing) problem: how do you balance flexibility with ease-of-use?
- Possible solutions:
  - Effective metaphors, visual and otherwise
  - Simplification of submit structure
  - Minimize repetition (DRY principle)

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Creating an Intuitive Interface

# Dychron and HTCondor

## The Dychron Approach

- Express data as clearly as possible
  - Consistent tables and charts make it easy to intuit data at a glance (once you know what you're looking at!)
- Break job classes down into their simplest form
- Allow users to reuse and recycle workflows among themselves as well as teammates

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Creating an Intuitive Interface

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## Online Demo

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Creating an Intuitive Interface

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## Future Developments

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Future Developments

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## Additional Improvements

- Our job submission widgets are process oriented (and stuck in the vanilla universe.) The first steps we're going to take after CondorWeek will be to find an accessible way to present DAGs to the “UnCondored.”
- We're also developing Linux clients (both headless and GUI)
- Adding of custom job ClassAds

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Future Developments

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## Additional Improvements

- Take advantage of our interface to leverage more control over jobs and owned machines
- Encourage interaction and data/results sharing among users

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Future Developments

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- Questions?
- <http://dychron.com/>
- Technical/general emails:  
[support@dychron.com](mailto:support@dychron.com)