

MindModeling@Home: A Volunteer Computing Resource for Cognitive Modeling

June 2009



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Performance and Learning Models (PALM) Team



6.1 (basic)

- Orientation and navigation in virtual environments
- Modeling the effects of fatigue on cognition
- Large scale cognitive modeling
- Distributed and high performance computing

6.2 (applied)

- Natural language and synthetic teammates
- Performance tracking and prediction

Dr. Jerry Ball, Dr. Scott Douglass, Mary Frieman, Dr. Kevin Gluck, Dr. Glenn Gunzelmann, Dr. Tim Halverson, Jack Harris, Dr. Tiffany Jastrzembski, Michael Krusmark, Dr. Don Lyon, Tom Mielke, Rayka Mohebbi, Rick Moore, Dr. Chris Myers, Monica Nguyen





Performance and Learning Models (PALM) Team Cont.,



Scientific Goal

Improved models of human perceptual, cognitive, and motor processes in complex, dynamic environments

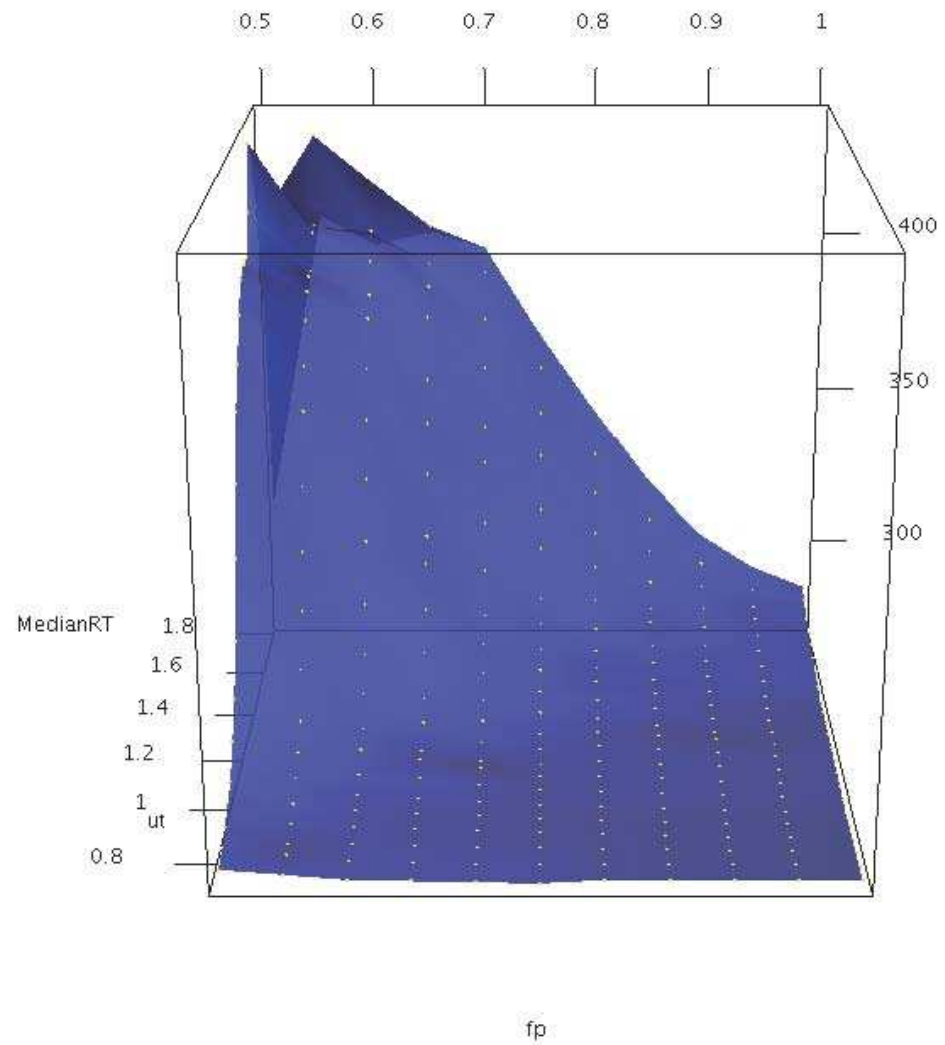
DoD Application

Computational Replicates

- Synthetic teammates
- Pedagogical agents
- Performance optimization analysis tools



Exploring the Parameter Space



Fatigue Research Model (SASTNM_7)

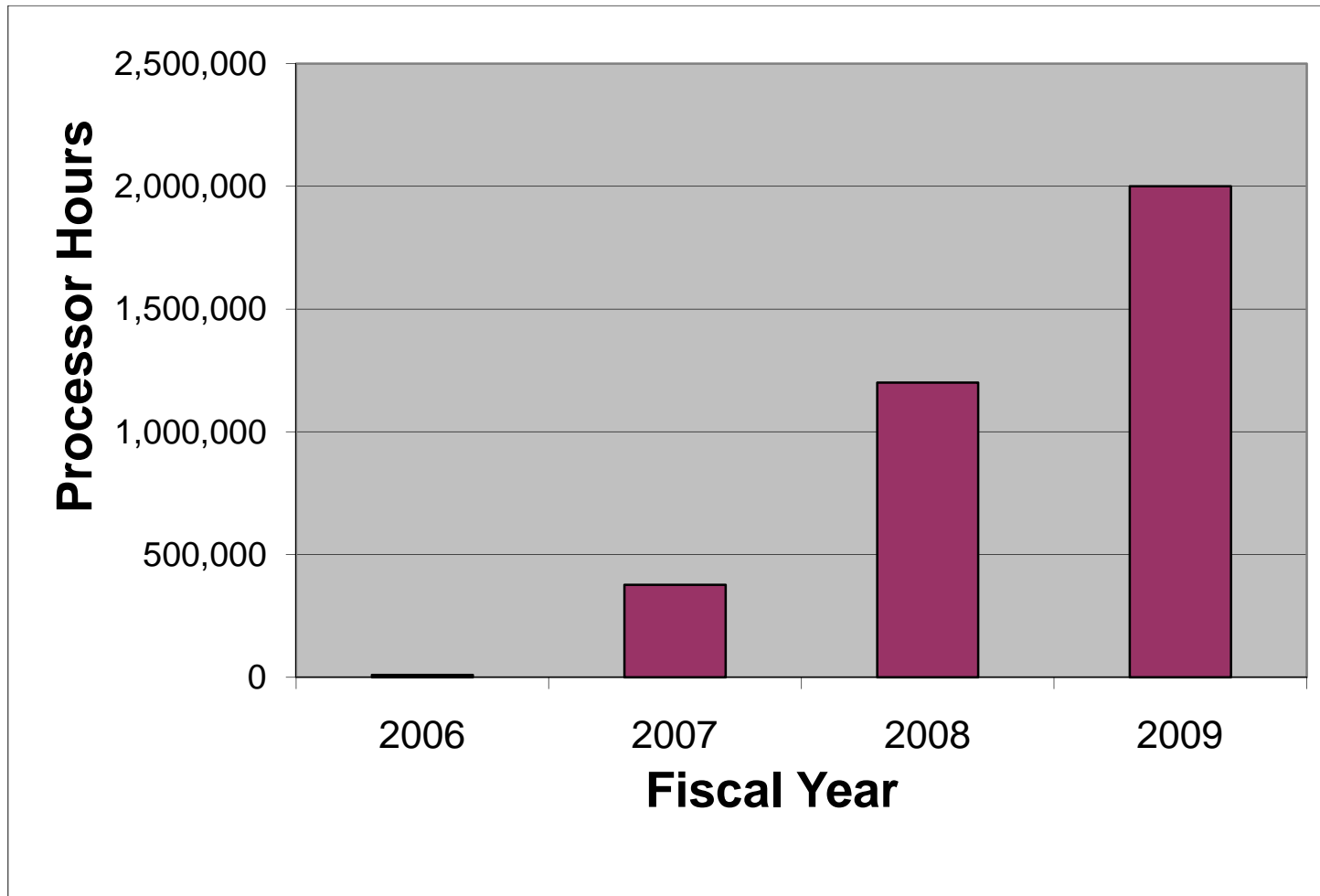
	Start	End	Steps
Procedural Fatigue Parameter	0.4	1	0.1
Procedural Fatigue Decrement	0	0.04	0.01
Declarative Fatigue Parameter	0	1	0.1
Declarative Fatigue Decrement	0	0.05	0.01
Retrieval Threshold	-1	1	0.5
Utility Threshold	0.7	1.8	0.1
Initial Utility	1.5	2.5	0.1

$$6 * 4 * 10 * 5 * 4 * 11 * 10 = 1,524,600 \text{ Parameter Combinations}$$
$$* 100 = \mathbf{100,524,600 \text{ Model Runs!}}$$

High Computational Demands



Growth in HPC Use

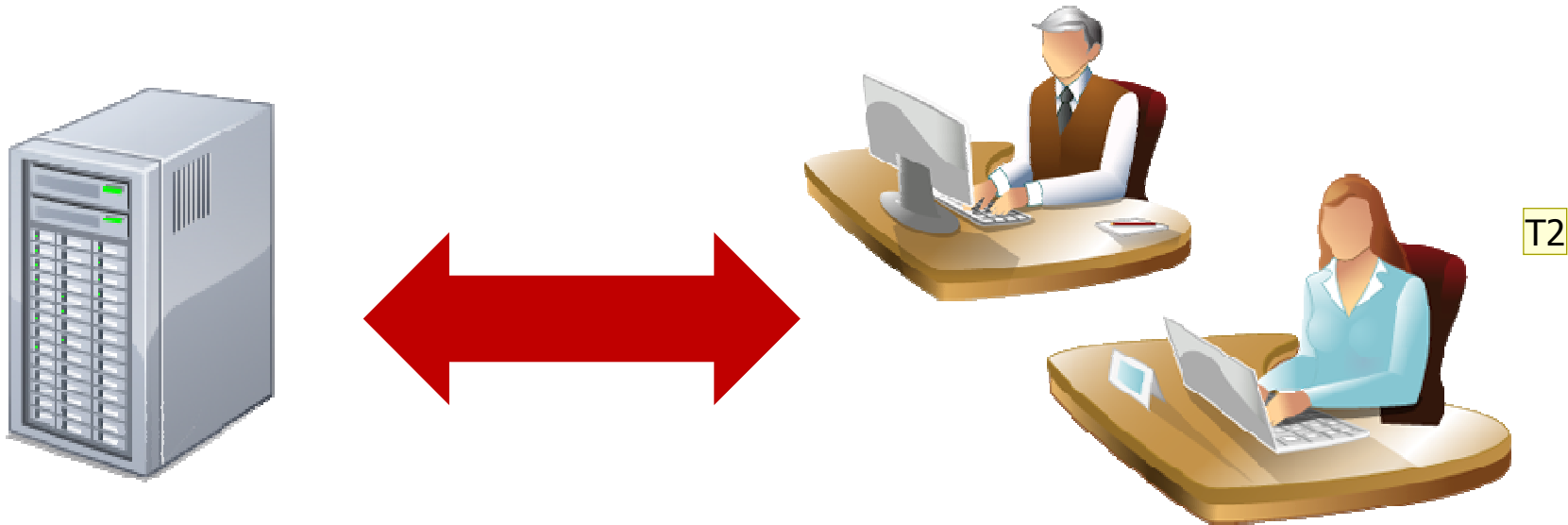




Challenges in HPC Use

- **Scheduling Tasks**
- **Time allocations**
- **Transferring completed data**
- **Limited amount of processing hours**
- **Secure access**

Volunteer Computing



- **Berkeley Open Infrastructure for Network Computing (BOINC)**
 - Scheduling / Work flow process management
 - File Distribution (Lisp VM / Model / Cognitive Architecture)
 - Data Management and Validation
 - Multi-core utilization (Client)

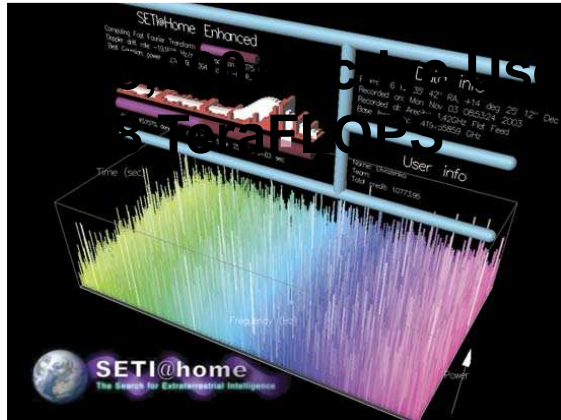


Slide 9

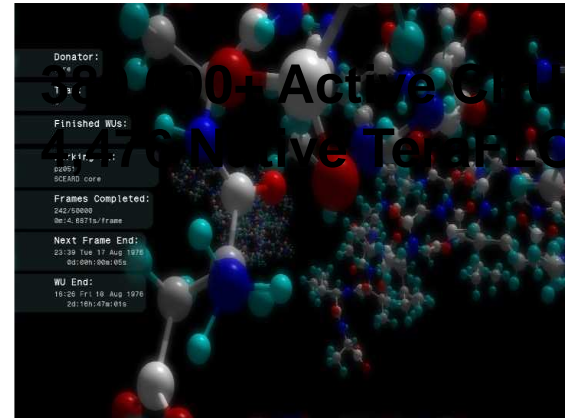
T2

Distributed computing in which owners donate their computing resources (i.e. storage, processing power) to one or more projects

Tommy, 6/17/2009



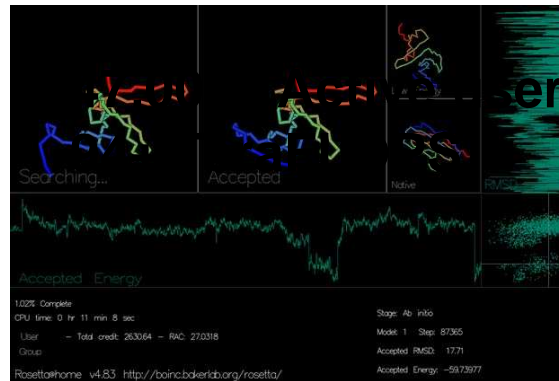
of servers,
100,000 CPUs



30,000+ Active CPUs,
4,760 Native Teraflops

Rosetta@home

Protein Folding, Design, and Docking




ers,

www.mindmodeling.org

MindModeling@Home (Beta) - Windows Internet Explorer

http://www.mindmodeling.org/beta/

MindModeling@Home (Beta)



MindModeling@Home (Beta)

MindModeling@Home (Beta) is a research project that uses volunteer computing for the advancement of cognitive science. The research focuses on utilizing computational cognitive process modeling to better understand the human mind. We need your help to improve on the scientific foundations that explain the mechanisms and processes that enable and moderate human performance and learning. Please join us in our efforts! MindModeling@home is not for profit.

MindModeling@Home (Beta) is based at the [Cognitive Engineering Research Institute](#) in Mesa, AZ.

Supported Volunteer Cognitive Applications

Join MindModeling@Home (Beta)

- [Read our rules and policies](#)
- [Download BOINC](#).
- When prompted, enter <http://MindModeling.org/beta/>
- If you have any problems, [get help here](#).

About

- [MindModeling Wiki](#)
- [Cognitive Science Society](#)
- [Cognitive Science Wiki](#)
- [ACT-R](#)


Returning participants

- [Your account](#) - view stats, modify preferences
- [Teams](#) - create or join a team
- [Certificate](#)

Community


- [Participant profiles](#)
- [Message boards](#)
- [Questions and answers](#)
- [Statistics](#)

User of the day



[Contact](#)
"To maintain one's ideals in ignorance is easy."
[Uta Haagen](#).....

Click [here](#) for server status



[Linux Version](#): 3.45
[Mac Version](#): 3.40
[Windows Version](#): 3.45

News

Status Update

June 5 2009 011:32:08
After many hours of configurations, builds, and reboots, the new Mind Modeling database is finally up! We're still configuring all our authentication and networking scripts, so please be patient as we wrap up the final stages of the installation. If you notice any abnormalities or inconsistencies with your account, please let me know and I will resolve the matter immediately.
-Tom

Server Updates

May 25 2009 011:32:08
Hi folks, MindModeling.org will be experiencing updates over the next couple days which may result in the server being shut down for extended periods of time. Please be patient and we will provide as much information as possible in regards to the status of the site.
-Tom

MySQL Reboot

May 18 2009 03:02:08
There was a quick disconnect this afternoon between our database server and MySQL. The system is rebooting the data right now, and everything should appear normal again in just a few hours.
-Tom

Current Jobs

Nodes Complete: 37,382,385

SASTNM_11	99.88%
SASTNM_11_2	99.72%
SASTNM_9_7	99.94%

Complete Jobs

PVTNM_nostuff2	100.00%
DSST_4	100.00%
DSST_5	100.00%
SSATNM_8	100.00%
SASTNM_10	100.00%
PRP_HF_Rev_orig2	100.00%
SAST_Reduced2	100.00%
SAST_Reduced3	100.00%
SAST_Reduced4	100.00%

Done

Internet | Protected Mode: On

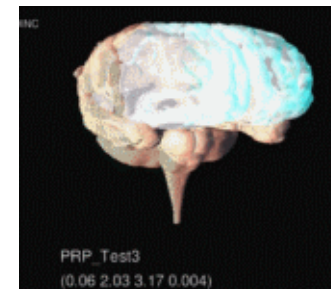
100%



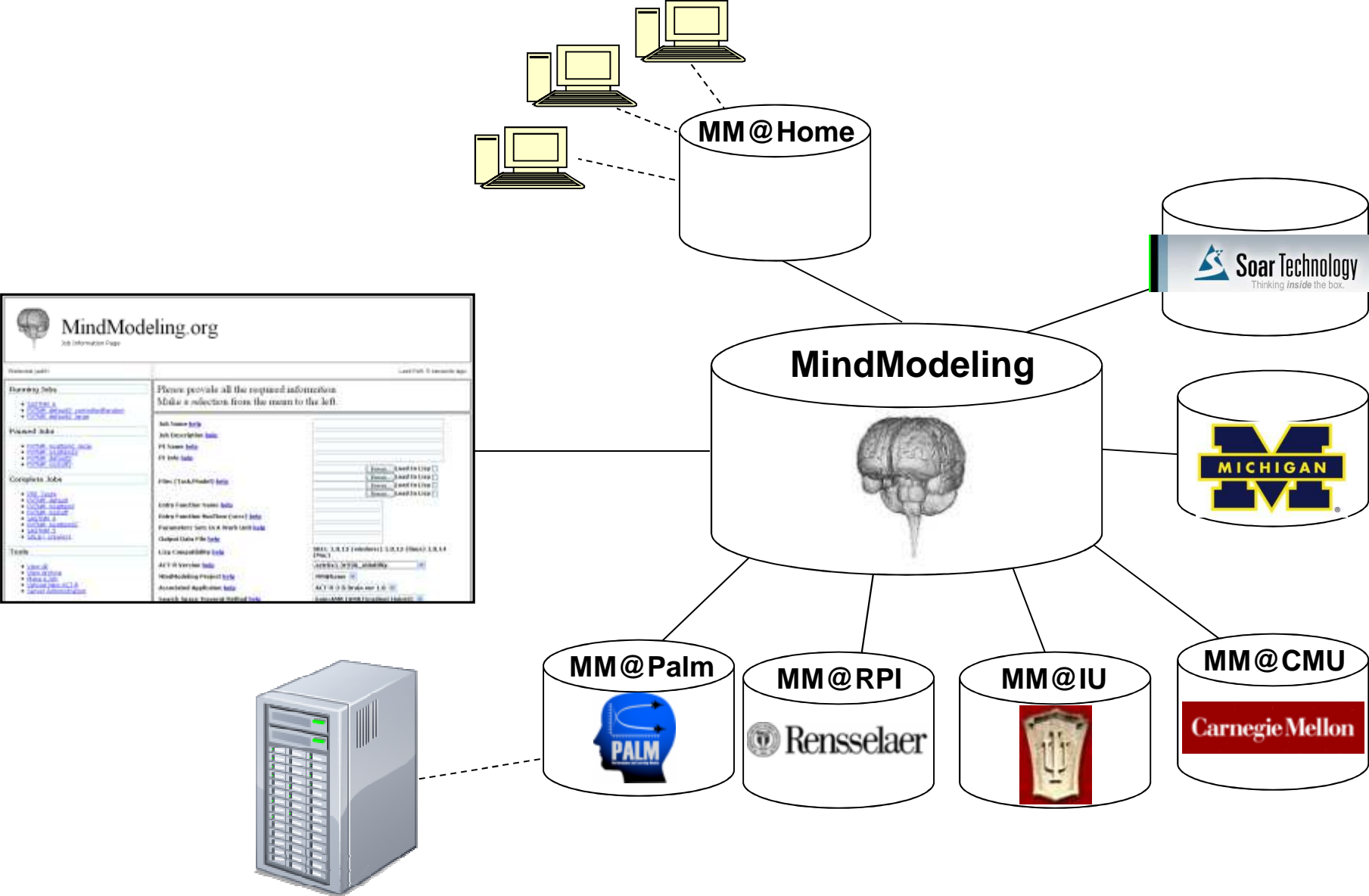
MindModeling@Home



- **MindModeling@Home: Meta-Computing project spanning diverse resources to create an integrated cognitive research environment**
 - **37,000,000+ parameter combinations searched**
 - **Centralized Web Submission system for models**
 - **Support for Mac, Windows, and Linux clients**
 - **On Average, 600-800 active users**
 - **82 Countries**



MindModeling Portal

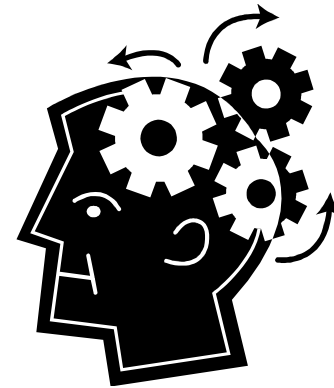


The future of MindModeling@Home



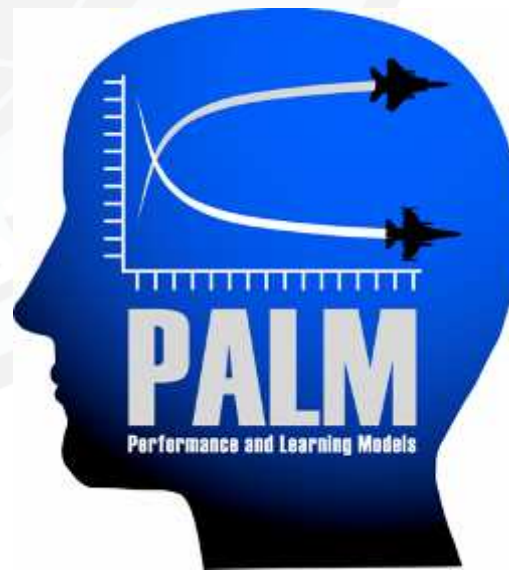
MindModeling@Home as a Volunteer Computing Resource for Cognitive Modeling

- Processing power comparable to HPC's
- Job submissions not restricted to secure access
- Fast turn-around time for models
- Capability of supporting distributed computing for a diverse range of applications
- Web-based submission system



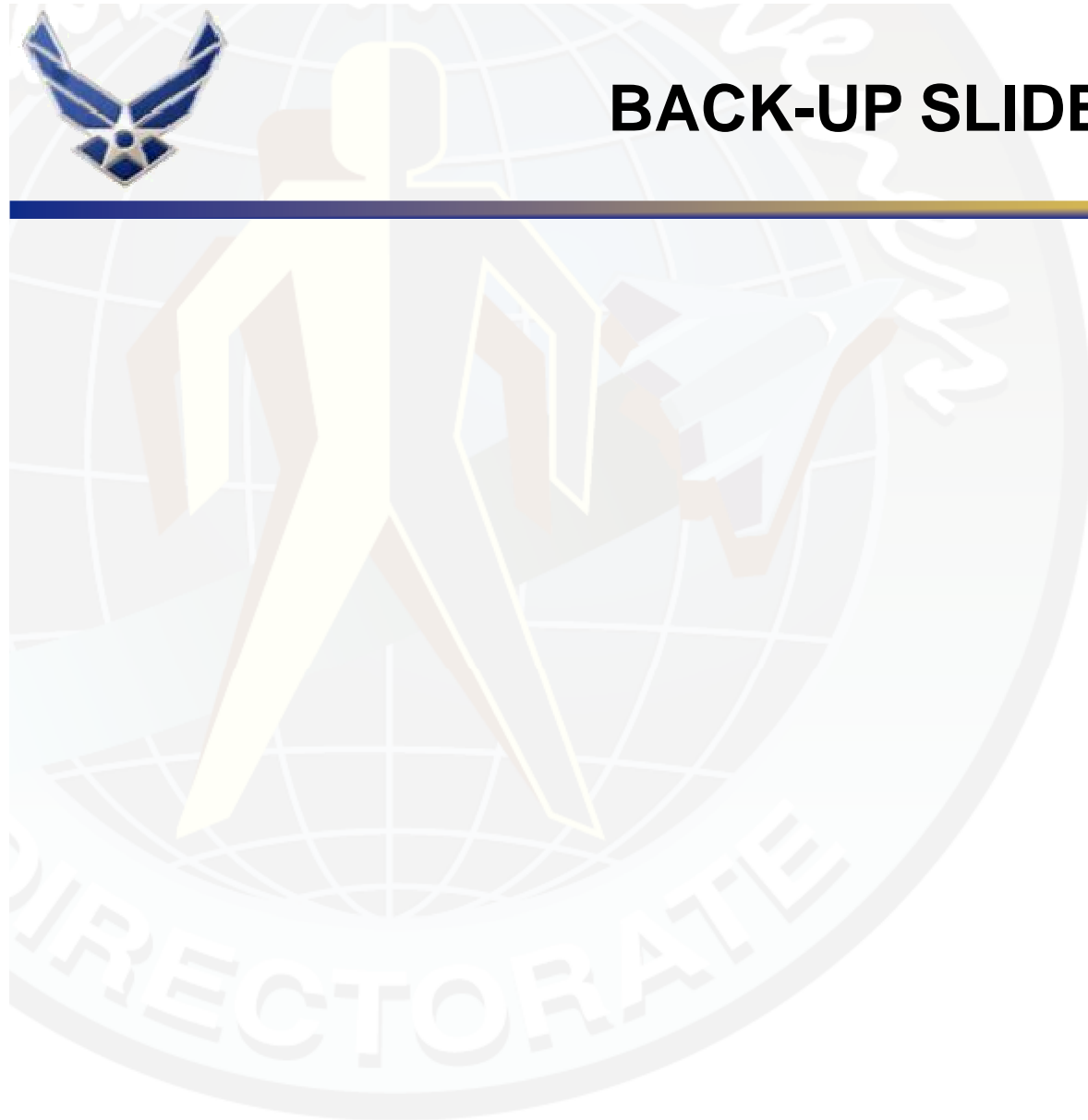


Thank you, Any Questions?





BACK-UP SLIDES



MindModeling Meta-Computing Infrastructure

