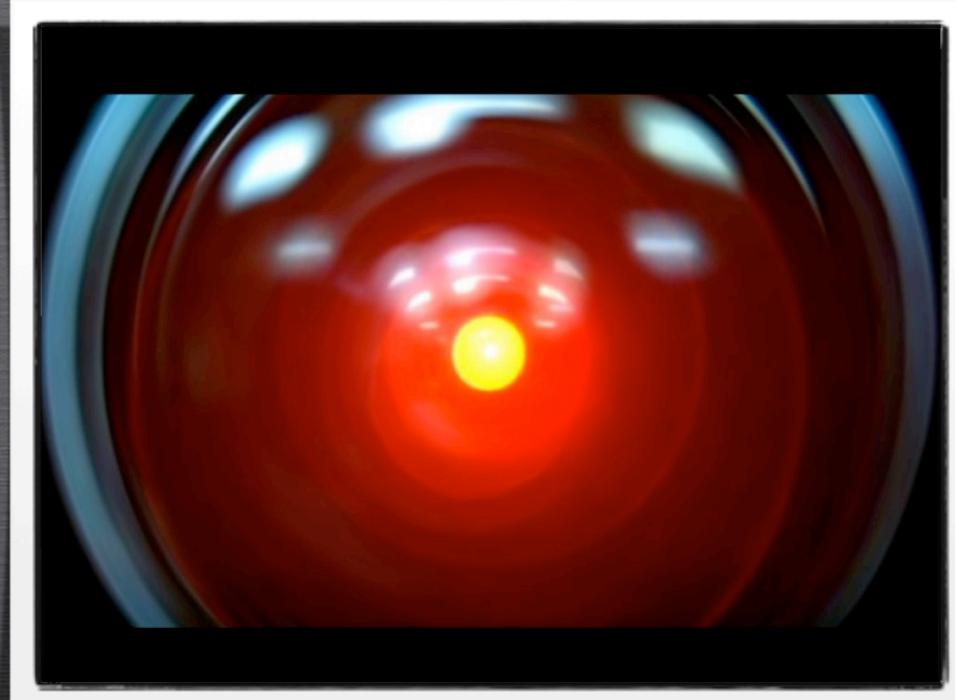


“SEARCHING FOR  
THE PRINCIPLES  
OF  
COMPUTATIONAL  
INTELLIGENCE”

SIMON WELLS



ARTIFICIAL  
INTELLIGENCE



# MULTIAGENT SYSTEMS



# ARGUMENTATION

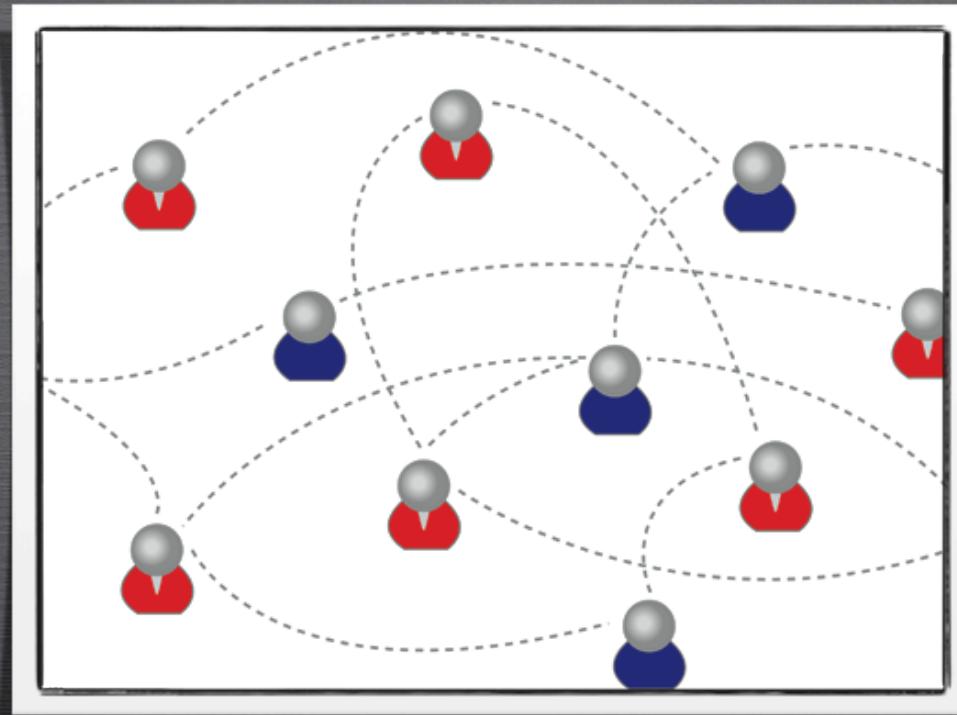


# DIALOGUE SYSTEMS

# RESEARCH OVERVIEW

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- System Characteristics:
  - Large-Scale
  - Secure
  - Robust
  - Distributed
  - Complex
  - Intelligent
- Applied To/Exploited within:
  - Education & Critical Literacy
  - Entertainment
  - Security
  - Democratic Representation
  - Industrial Automation
  - Commercial Trading
  - Law



# WEB-SCALE ARGUMENTATION, PERSUASIVE & SCAFFOLDING TECHNOLOGIES



The screenshot shows a user interface for a Multi-Agent Argument Logic & Opinion (MAGtALO) system. At the top left is a logo featuring three stylized human figures and the text "MAGtALO". On the left side, there is a sidebar with two user profiles: "John W." (Director) and "Martin" (Labour N). The main area contains a conversation window titled "Ask Martin a question...".  
**John W. (Director):**  
Why is this the case?  
Do you have a different reason?  
↳ you agree with this? (highlighted in green)  
Can you tell me more?  
**Martin (Labour N):**  
It will undermine civil liberties  
The real target is the people whom the home office has lost  
Is the current point is true John?  
It will be black people and those from ethnic minorities who will find that they need to show their card most often  
**Martin:**  
No, I don't agree. If you are saying the police might discriminate against black people (even though it is illegal), that is a serious problem that needs to be tackled. But should not stop us having ID cards  
**Current point »**  
If you are saying the police might discriminate against black people (even though it is illegal), that is a serious problem that needs to be tackled. But should not stop us having ID cards  
**Buttons:**  
I Agree With This  
I Don't Agree With This  
Who agrees with this?

# WEB-SCALE ARGUMENTATION

MultiAgent Argument Logic & Opinion (MAGtALO) software to support large-scale online interaction within specific complex domains & debates

Sarah Palin – Sarah Palin on the politicization of the Copenhagen climate conference – washingtonpost.com

Getting Started Latest Headlines

alin – Sarah Palin on the p... +

common-sense policies to respond to the coastal erosion, thawing permafrost and melting sea ice that affect Alaska's communities and infrastructure.

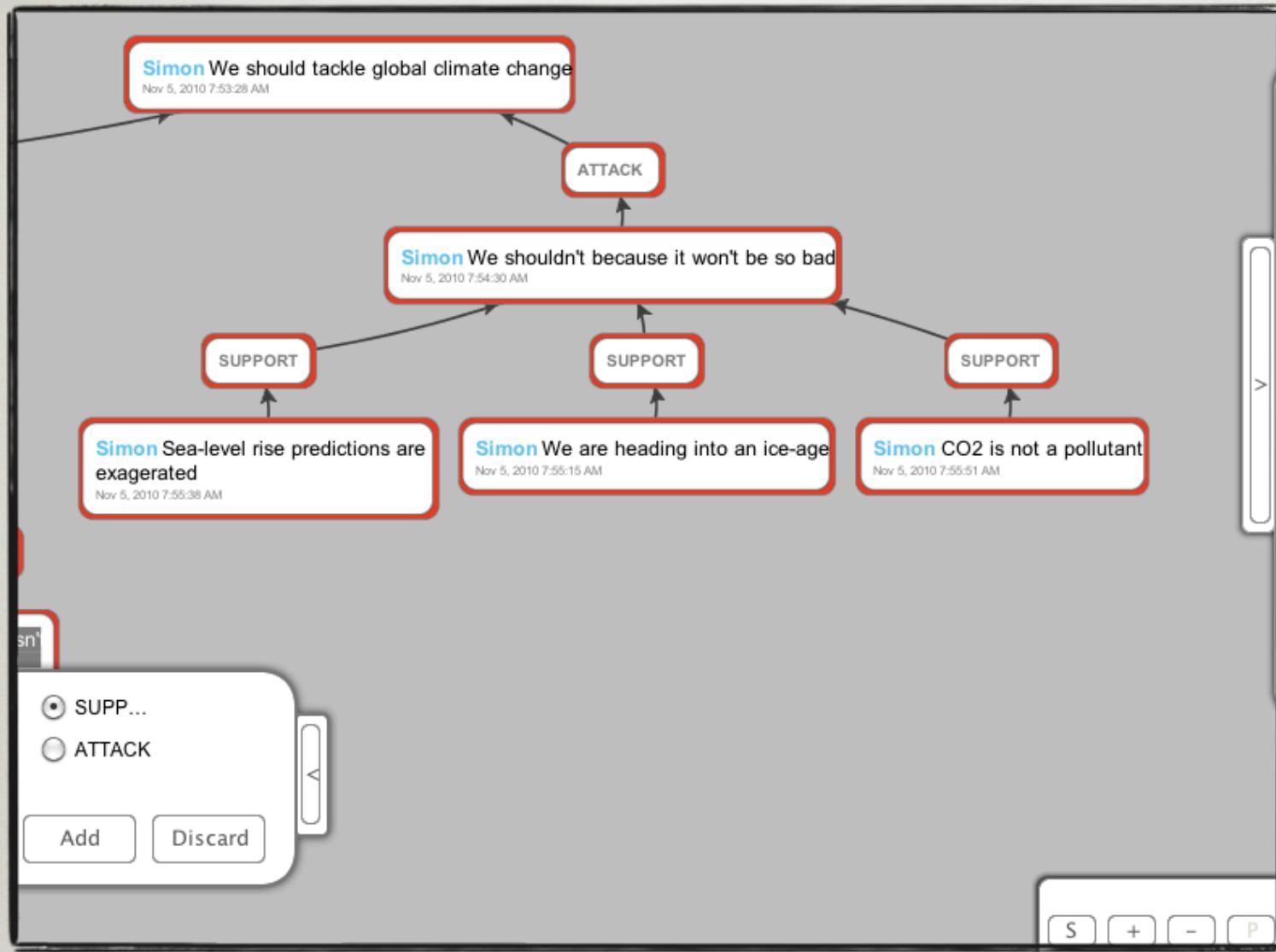
we recognize the occurrence of these natural, cyclical environmental trends, we with assurance that man's activities cause weather changes. We can say, however, potential benefits of proposed emissions reductions are far outweighed by economic costs. And those costs are real. Unlike Copenhagen -- which actually allow them to proposal calls for serious cuts in our own long-term energy use. Those would require Congress to pass its cap-and-trade legislation, resulting in higher energy costs (as Obama admitted during his campaign). Americans are hoping for these days. And as public opposition continues to stall s cap-and-tax legislation, Environmental Protection Agency bureaucrats plan to carbon emissions themselves, doing an end run around the American people.

We're not the only nation whose people are questioning climate change schemes. In the United States, energy prices skyrocketed after it began a cap-and-tax program. Elsewhere, Australia's Parliament recently defeated a cap-and-tax bill. Surely other nations will follow suit, particularly as the climate e-mail scandal continues to unfold.

In his inaugural address, President Obama declared his intention to "restore science to its place." But instead of staying home from Copenhagen and sending a message that the United States will not be a party to fraudulent scientific practices, the president has gone to the conference. He plans to fly in at the climax of the conference in hopes of sealing a deal whatever deal he gets, it will be no deal for the American people. What Obama promises to bring home from Copenhagen is more pressure to pass the Democrats' proposal. This is a political move. The last thing America needs is misguided

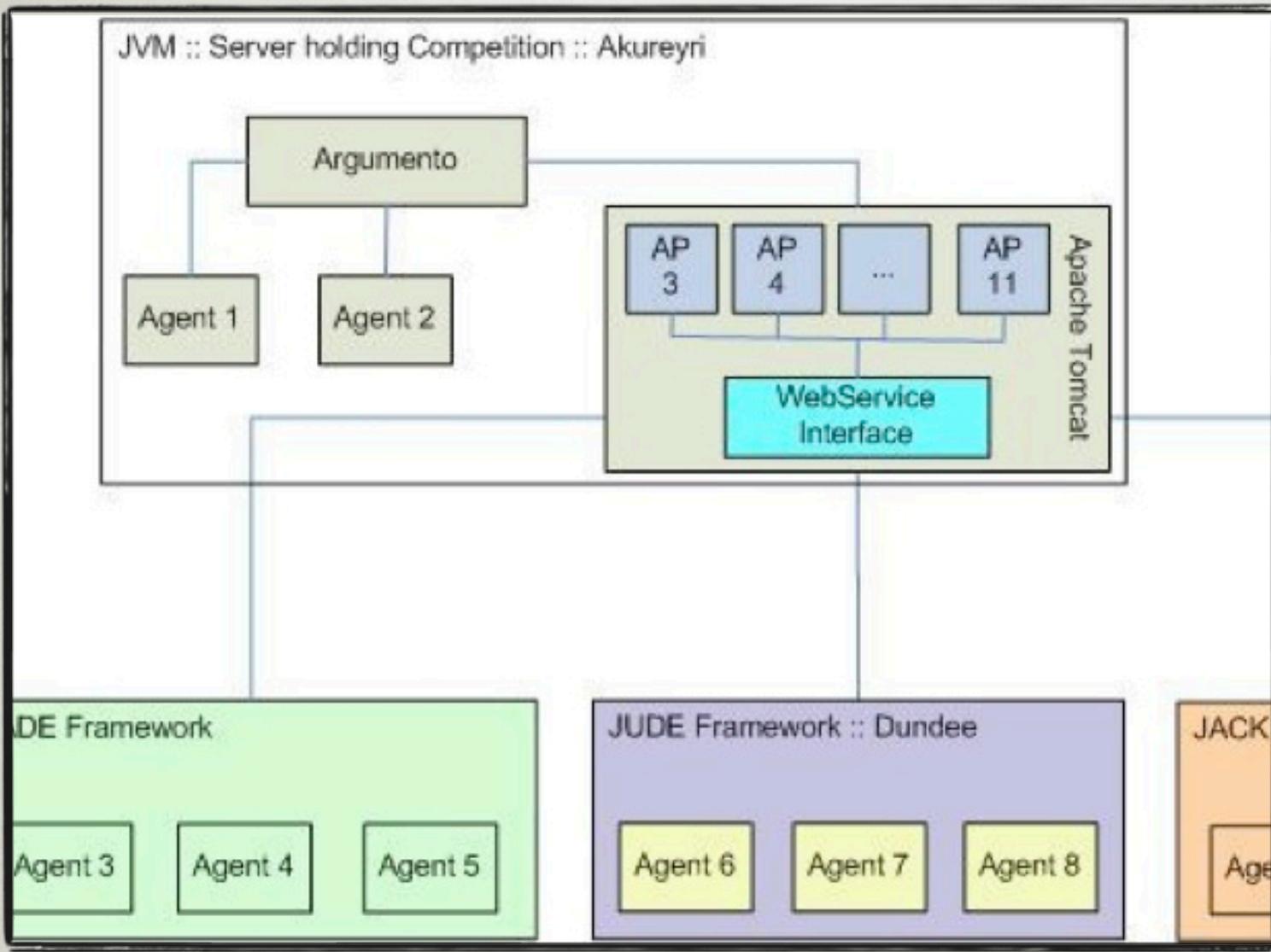
# WEB-SCALE ARGUMENTATION

ArguBlogging + FireBack software to support argumentation distributed across the web, integrating and *argument web* within the existing WWW to facilitate greater critical online interaction.



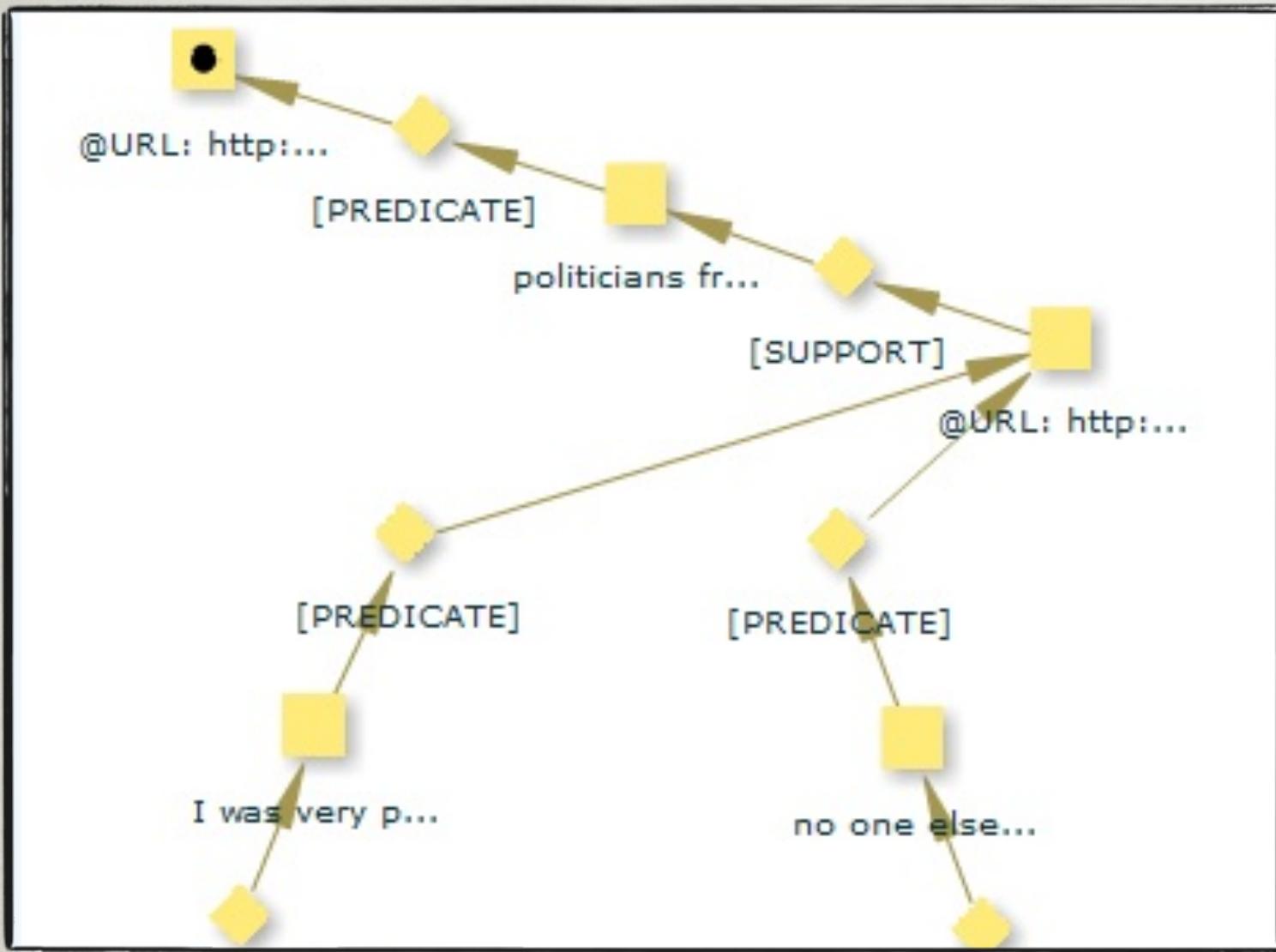
# PERSUASIVE TECH

Parley Software to support small-group tutorial work in complex domains



# THE ARGUING AGENT COMPETITION

A competitively oriented testbed for benchmarking the performance of automated argumentation systems modelled on the TAC & CAT competitions- Joint work with Akureyri, Toulouse, Vietnam, Warsaw & Dundee



## SUPPORTING INFRASTRUCTURE

- DGDL for describing dialogue game rulesets
- AIF - Part of the working group on dialogical extensions
- Online Visualisation of Argument (OVA) flash widget to render visualisations of arguments (& dialogues)
- AIF-DB to store arguments online

# DGDL

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- DGDL - Pronounced “*Digidal*”
- A DSL for describing dialogue games
- Formally underpinned by an EBNF grammar
  - Verify syntactic correctness

# Aim

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- Syntactically correct (verifiable) description of a wide variety of dialogue games
- Including many extant games
  - Hamblin, Mackenzie, Woods & Walton, Walton & Krabbe, Girle, McBurney & Parsons, Bench-Capon
- & a whole world of new games:
  - MAGtALO protocol
  - Argument Blogging protocol

# Broad Overview

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- Composition:
  - Game Components, e.g.
    - participants,
    - commitment stores,
    - &c.
- Rules:
  - Regulations that *indirectly* manipulate components
- Interactions:
  - Regulations for direct (*by players*) manipulation of components

# A (*very*) simple example

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```
Simple{  
    {turns,magnitude:single,ordering:strict}  
    {players,min:2,max:2}  
    {player,id:Player1}  
    {player,id:Player2}  
    {store,id:CStore,owner:Player1}  
    {store,id:CStore,owner:Player2}  
    {Assert,{p},"I assert that", {  
        store(add, {p}, CStore, Speaker),  
        store(add, {p}, CStore, Listener)  
    }  
}  
}
```

# Software

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## ◎ Parser & Tools

- Verifier
- Game Engine
- Game Library (Currently GitHub)

## ◎ available *real-soon-now*™ ;)

# APPLICATIONS

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- Foundational Argumentation Technologies:
  - AIF2 [*co-author on submission to Argument & Computation (Chris?)*]
  - OVA & AIFDB [*ongoing projects @ Dundee - now part of DAM Project*]
  - DGDL [*Journal of Applied Logic*]
- Web-Scale Argumentation
  - MAgtALO [*IEEE Intelligent Systems*]
  - ArguBlogging [*to be submitted to Journal of Web Semantics*]
- Persuasive Technologies
  - Parley [*to be submitted to British Journal of Educational Tech.*]
- Strategic Argumentation (*current/immediate future research*)
  - Combinatorial Dialogue [*to be submitted to AI + 2 Proposals*]

THANK YOU FOR YOUR  
ATTENTION