

# Key LM Related Technologies

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## *Suspicious Cooperation*

- sharing threat and status information with potentially compromised entities
- rapid reasoning and decision making based on cost vs. benefit
- utilizes global environmental information

## *Impermeable Wrappers*

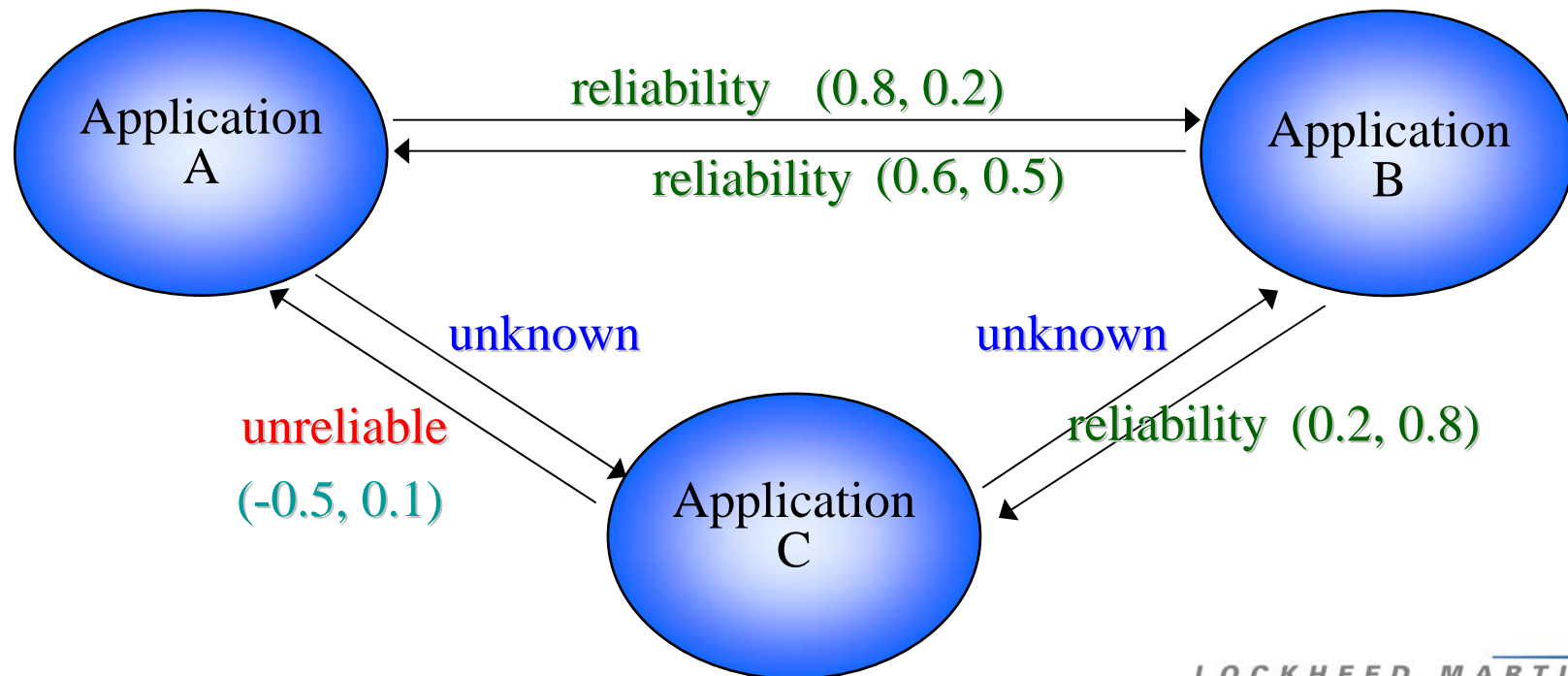
- wrap applications or data for information and control
- control of access and data flow
- information allows behavior modeling

## *Conceptual Space Behavior Modeling*

- geometric knowledge representation
- utilizes intuitive separable domains
- facilitates use of disparate similarity metrics within and across domains

# Suspicious Cooperation

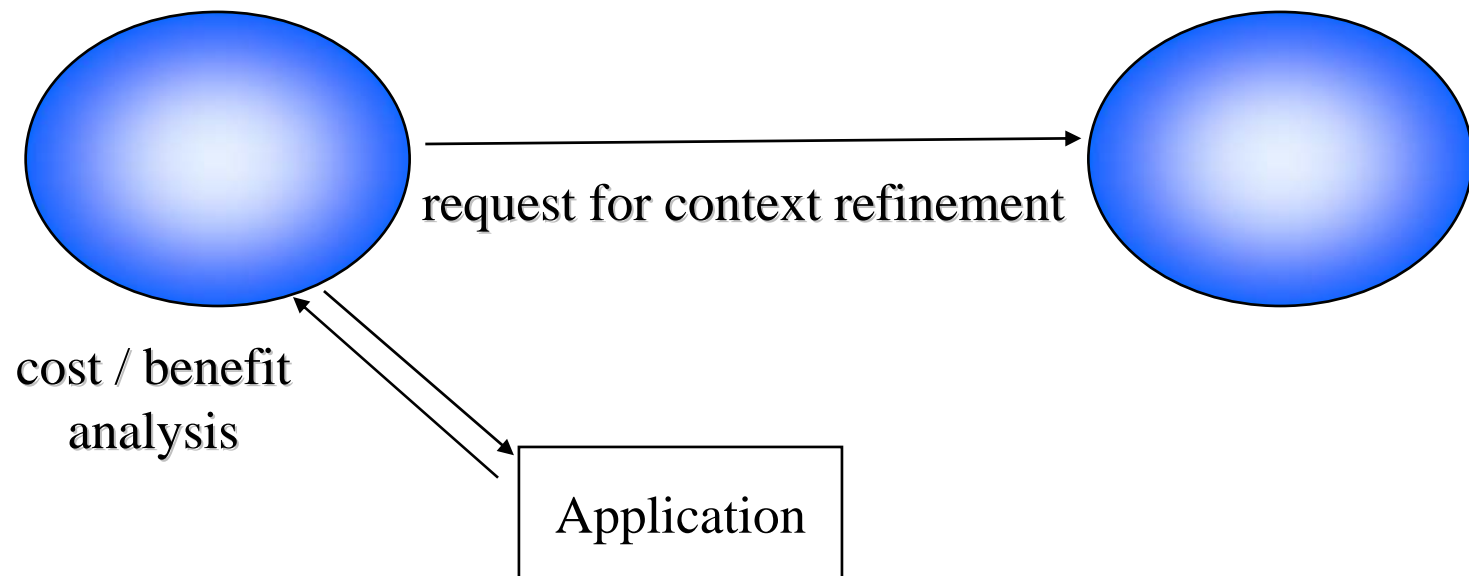
The method by which a group of entities – which may have *complete, partial, or no knowledge* of each other's intentions and behavior patterns – interact with one another in order to best fulfill their individual missions.



# Cost-Benefit Analyses

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- Intercepts communications to and from an application
- Each communication (request) is weighed based on mission cost/benefit
- May gather information from outside sources to improve validity of cost/benefit analysis

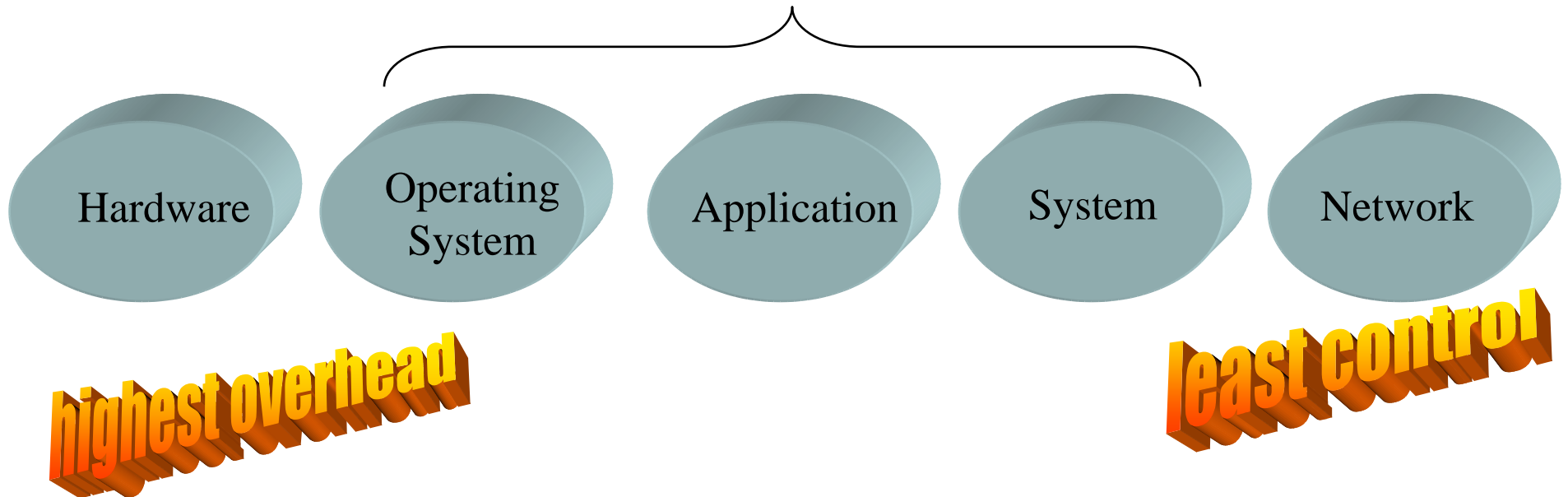


# Wrapper Solution

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What Can Be Wrapped?

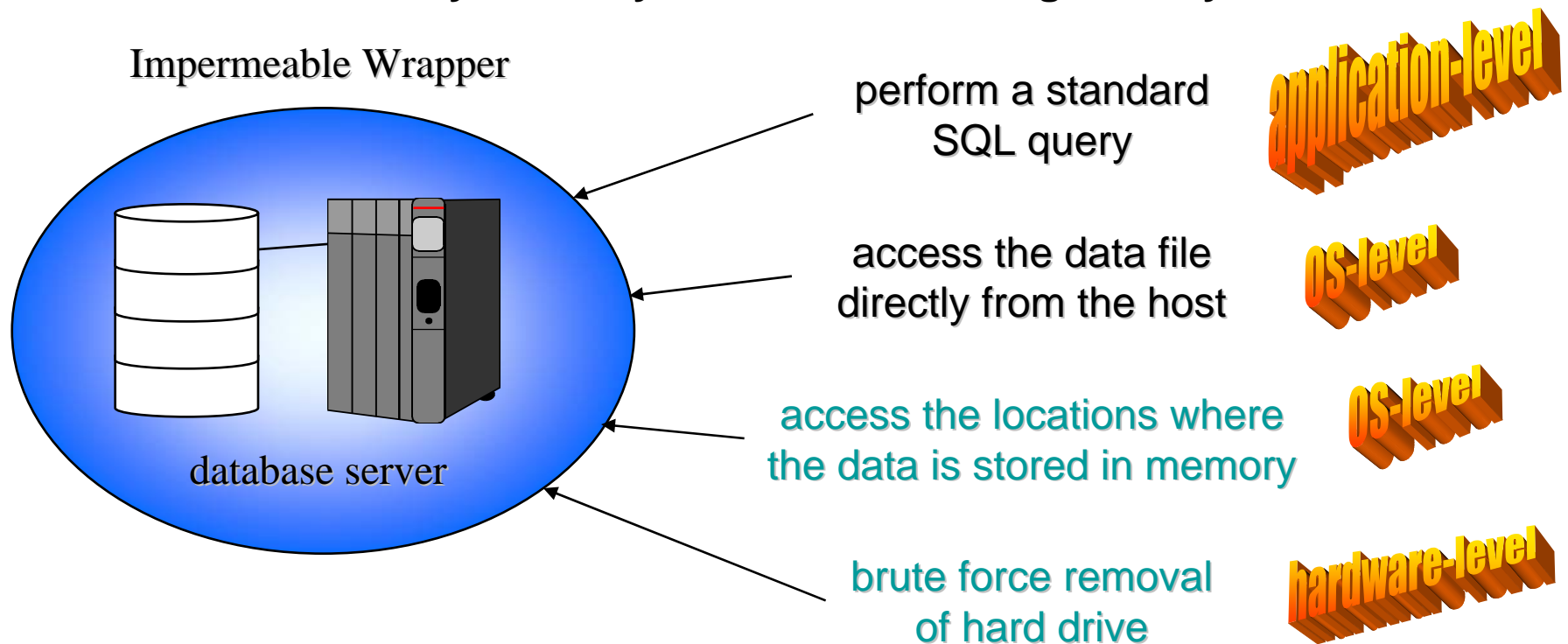
current focus



# Impermeable Wrappers

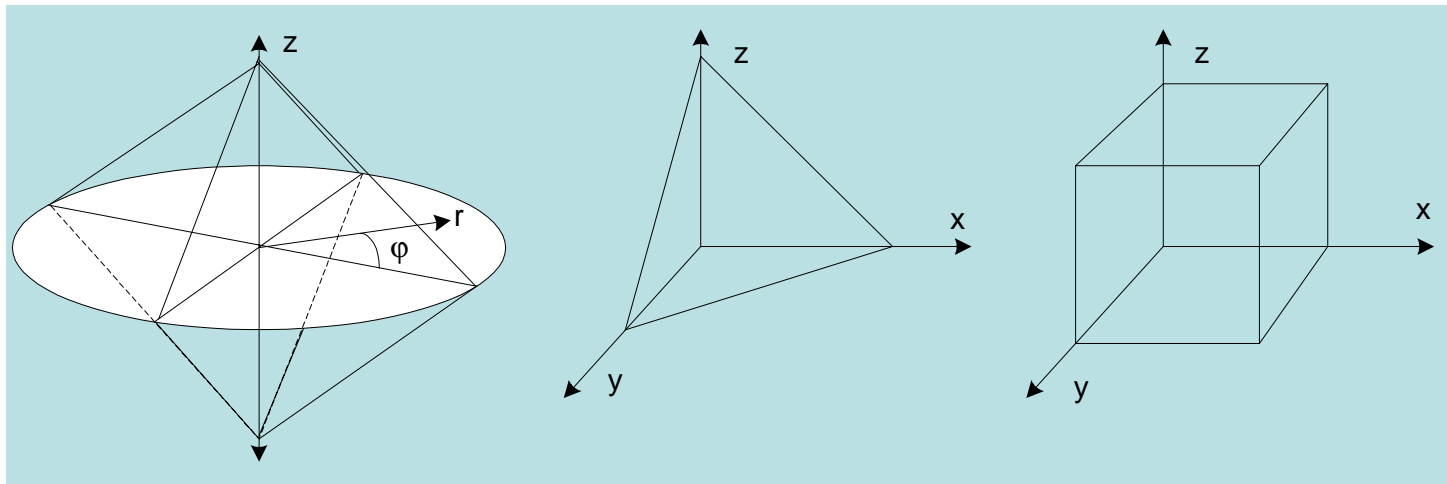
## Controlling all forms of data & application access

Develop wrapper technology that ensures all messages sent and received by an entity are funneled through our system.



# Conceptual Space Behavior Modeling

- **Conceptual Spaces:** New knowledge representation technique that effectively models behavior using analogies to human cognition. This technique makes heavy utilization of metrics that connect the data within the various domains of interest. This allows actionable results: i.e. the distance from a given behavior to the normal is quantified and can be acted on based on fuzzy logic or thresholding.



# Recent Conceptual Spaces Applications

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- Insider Threat Detection
  - combines expert knowledge & automatically gathered profile information
  - successful role identification experiment in-house on operational network
- Wireless Signal Strength
  - showed statistically significant improvement on predicting high/low coverage areas over traditional heuristic driven technique
- Network Application Modeling
  - currently gathering results on an operational network at AFRL
- White ship Behavior Modeling
  - recently begun internal tests on viability for detecting inappropriate ship behavior in relation to expected ship lane paths