

# IEESIM:

## An Architecture of Information Exchange and Sharing for NASA Tool Integration

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# IEESIM\* Overview

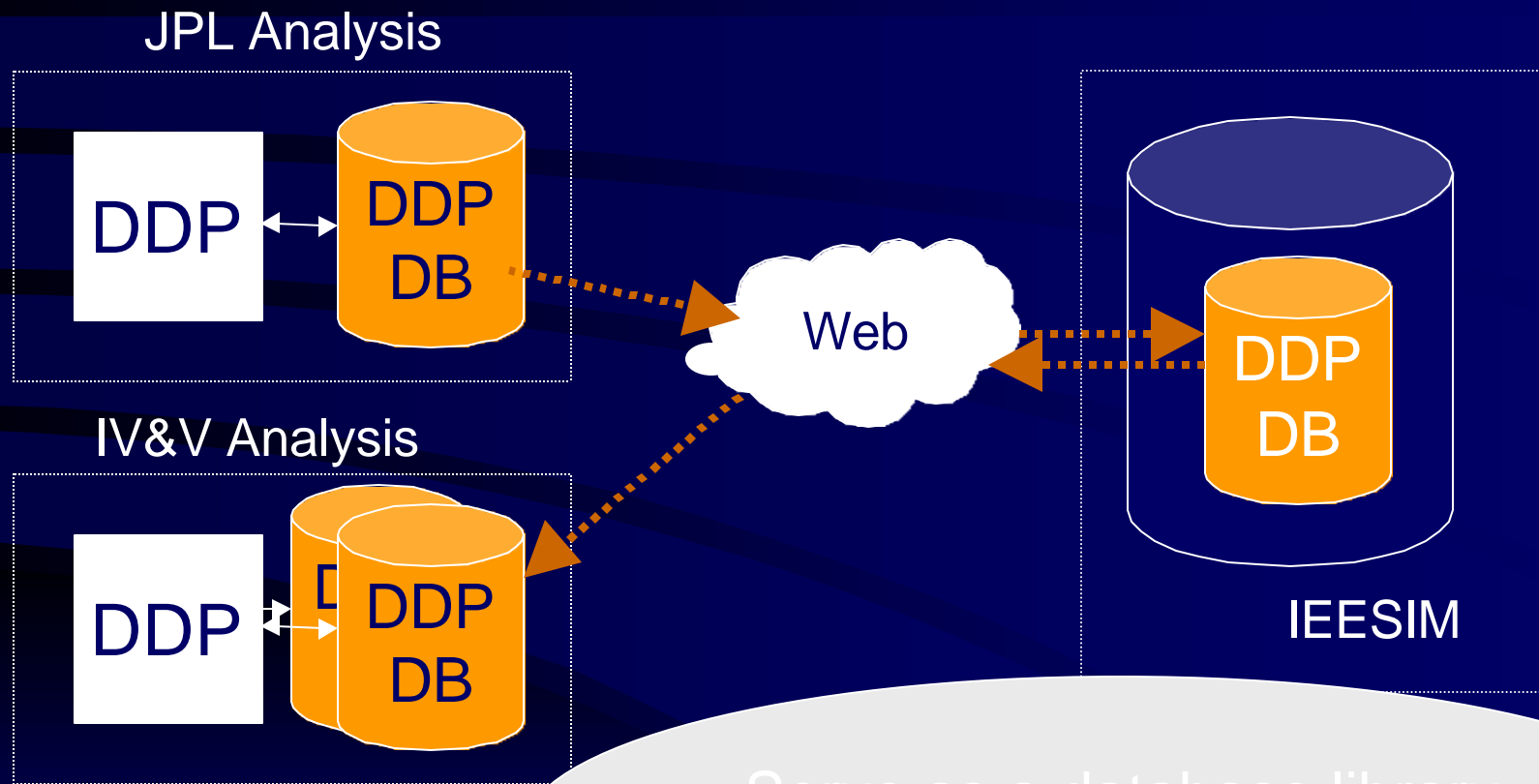
- Introduction
- IEESIM: The Proposed Architecture
- Research Issues
- Lessons Learned
- Conclusion

\* IEESIM: *Integrated, Extensible, Exchangeable, Shared Information Mediator*

# Context and Challenges

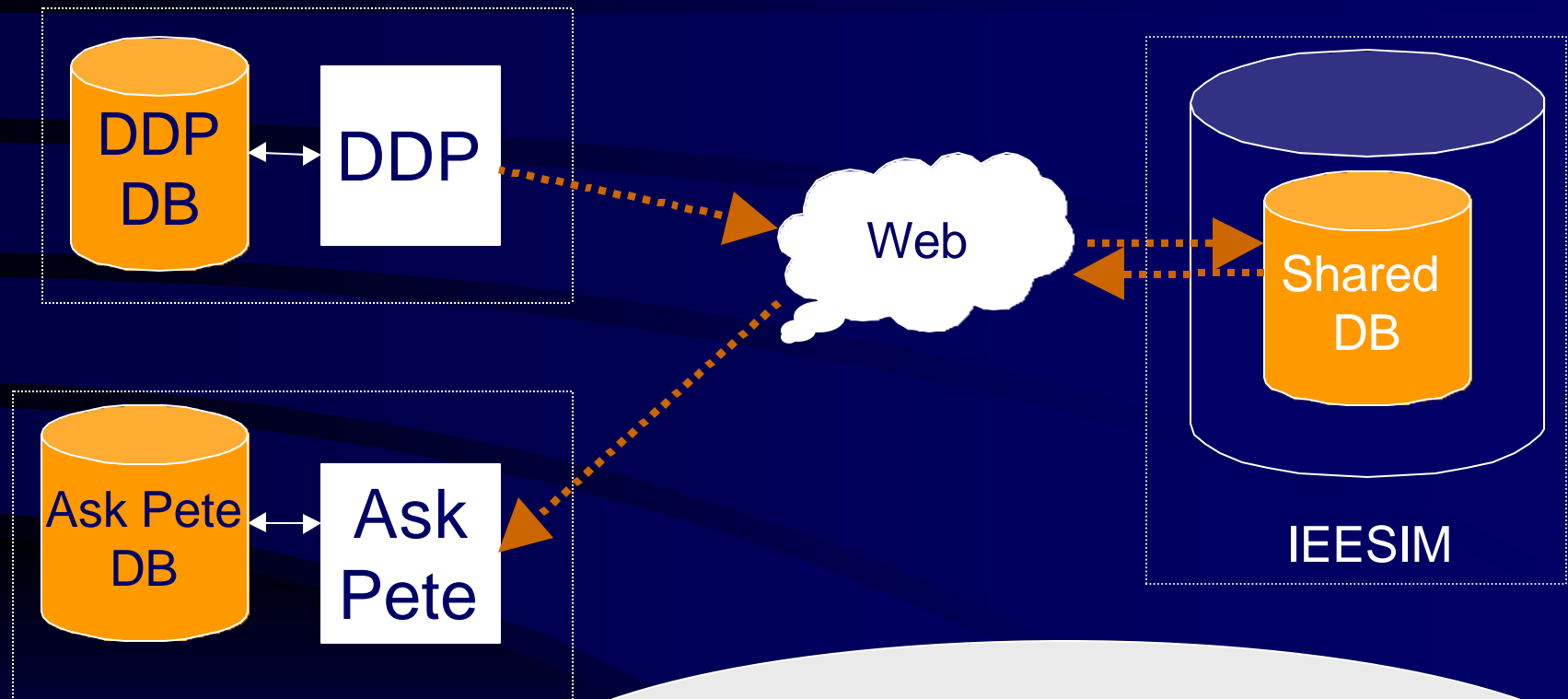
- Two NASA tools (DDP & AskPete) are
  - developed independently,
  - geographically distributed,
  - complementary but related aspects of the same overall task
- How could the tools be integrated in the context of
  - data sharing and exchange
  - operating stand-alone
  - control coordination
  - future integration with other related tools.
- Study on the shared information system for risk assessment, QA, and IV&V

# Scenario I: Inter-Use Sharing



Serve as a database library  
across organizations

## Scenario II: Inter-Tool Sharing



Provides Online Access & Manipulation  
of Data

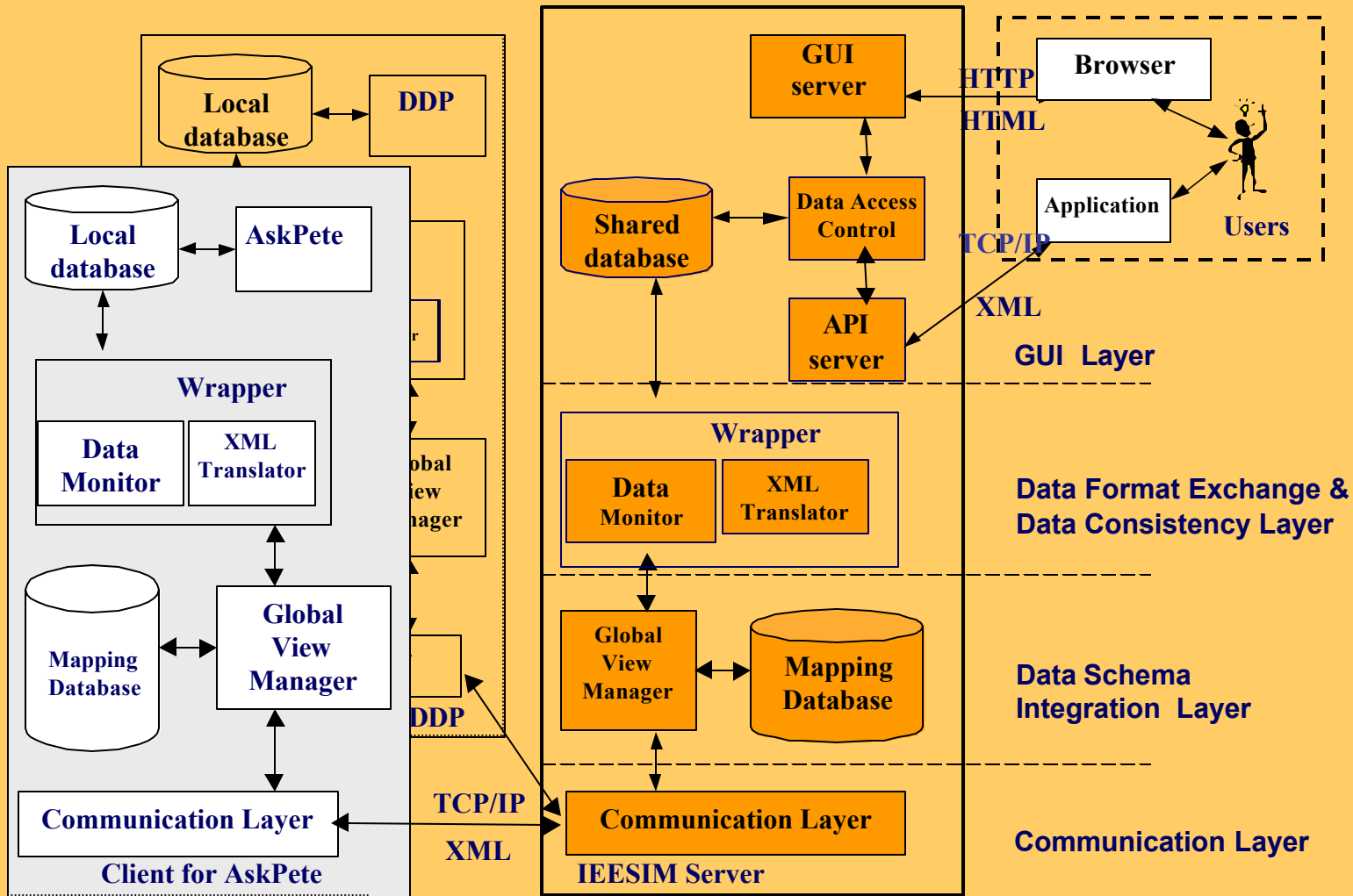
# Benefits

- From enterprise-wide, shared information systems
  - a “lessons learned” data base
  - a repository of corporate knowledge
  - data for case-based reasoning
  - independent assessment and review services
  - trend analysis

# Solution Approach

- IEESIM Approach
  - *Integrated* views from individual data sources
  - *Extensible* for seamlessly adding future data sources
  - *Exchangeable* data format across risk assessment tools
  - *Shared Information Mediator* to enable organizationally integrated risk assessment

# IEESIM: The proposed Architecture



# Research Issues

- Exchange Data Format
  - translators between every pair of tools.
  - employ a universal data exchange format (XML)
- Data Schema Integration
- Data Consistency Management

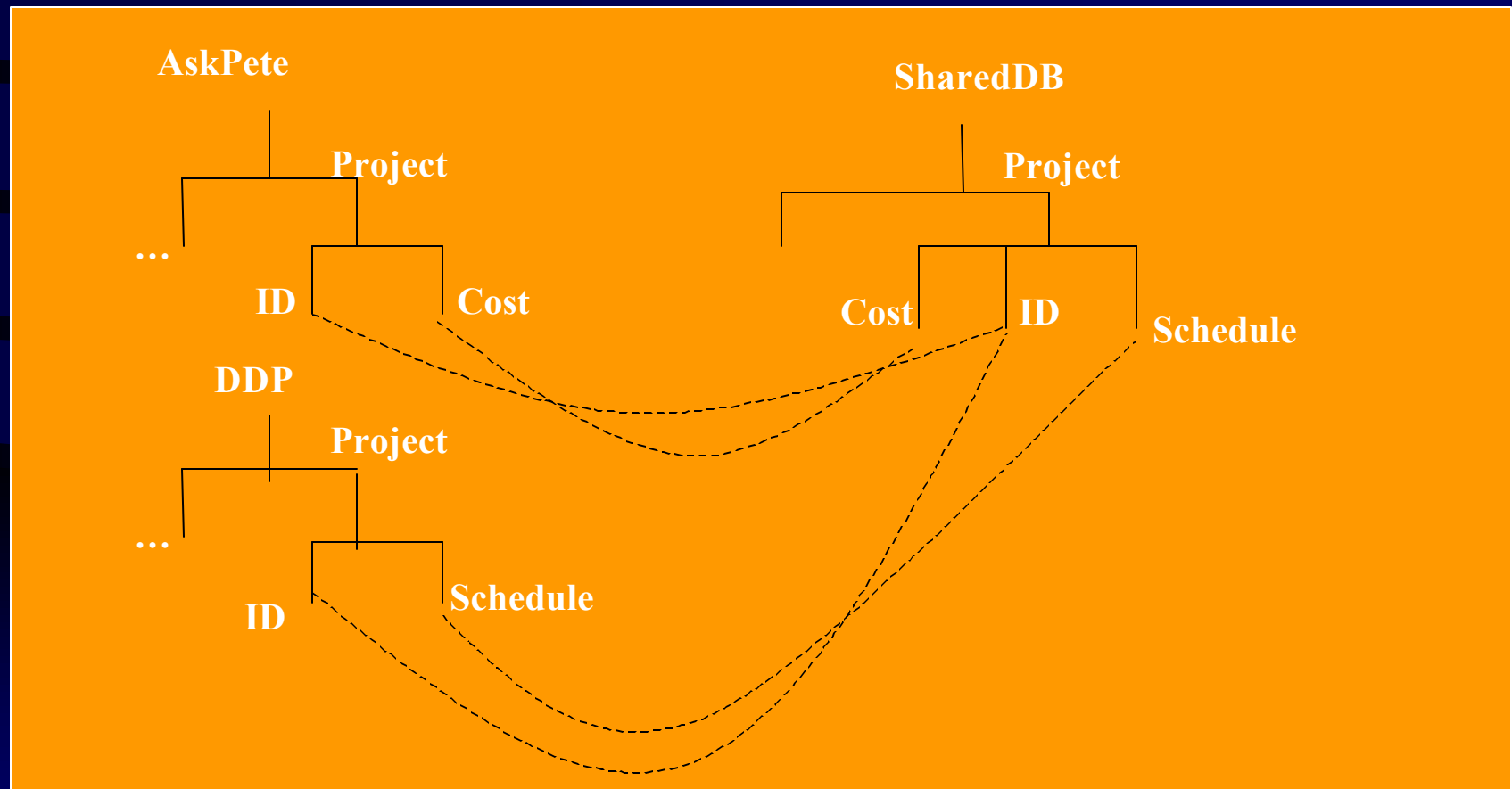
# Issue 1: Exchange Data Format (XML)

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```

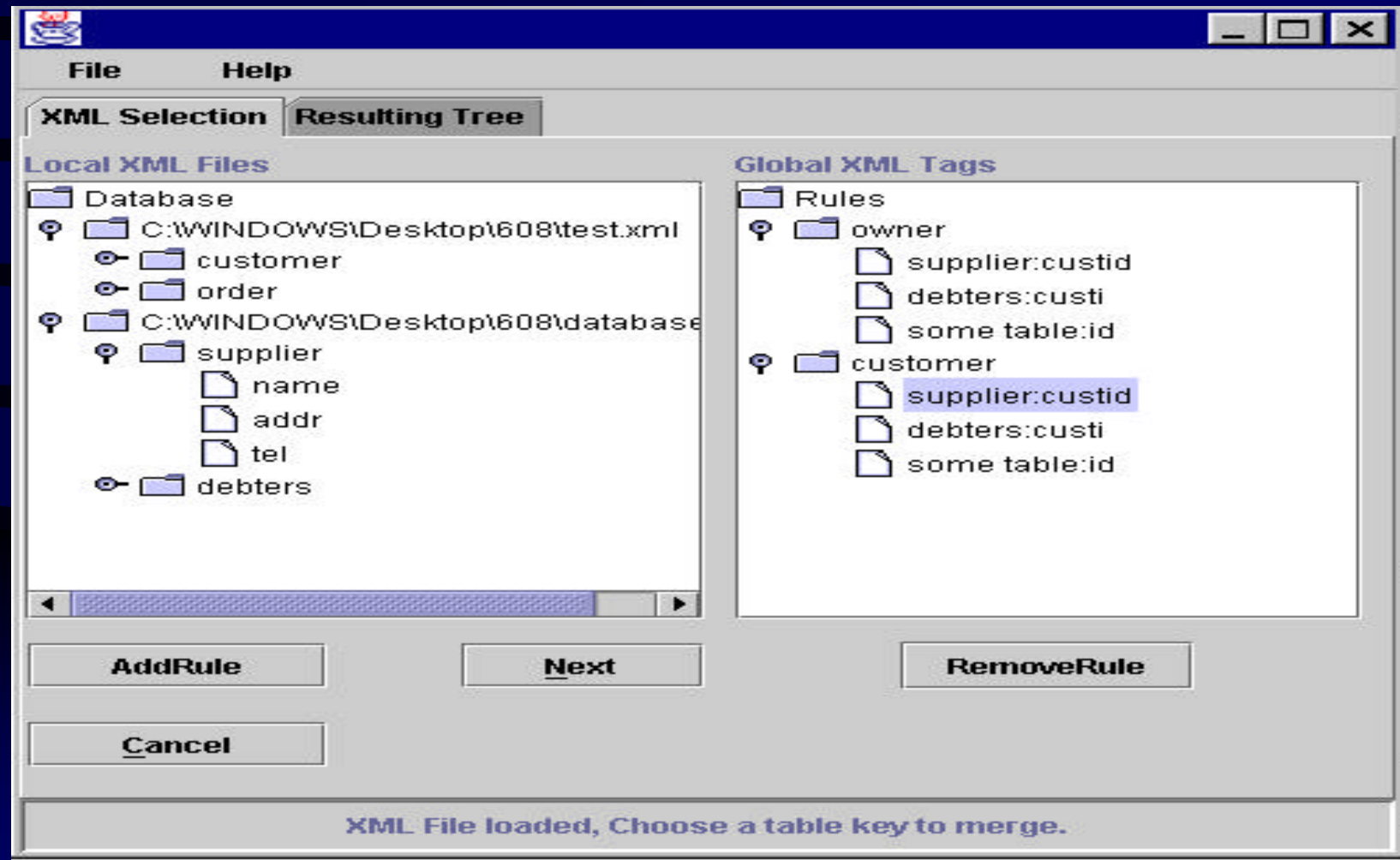
Junk	Description	Keywords	Value	PactID	FailureModeID
4	NA	NA	0.2	P16	F14
5	JPL	NA	0.2	P16	F15

# Issue2 : Data Schema Integration

- Global View Mapping (GVM)



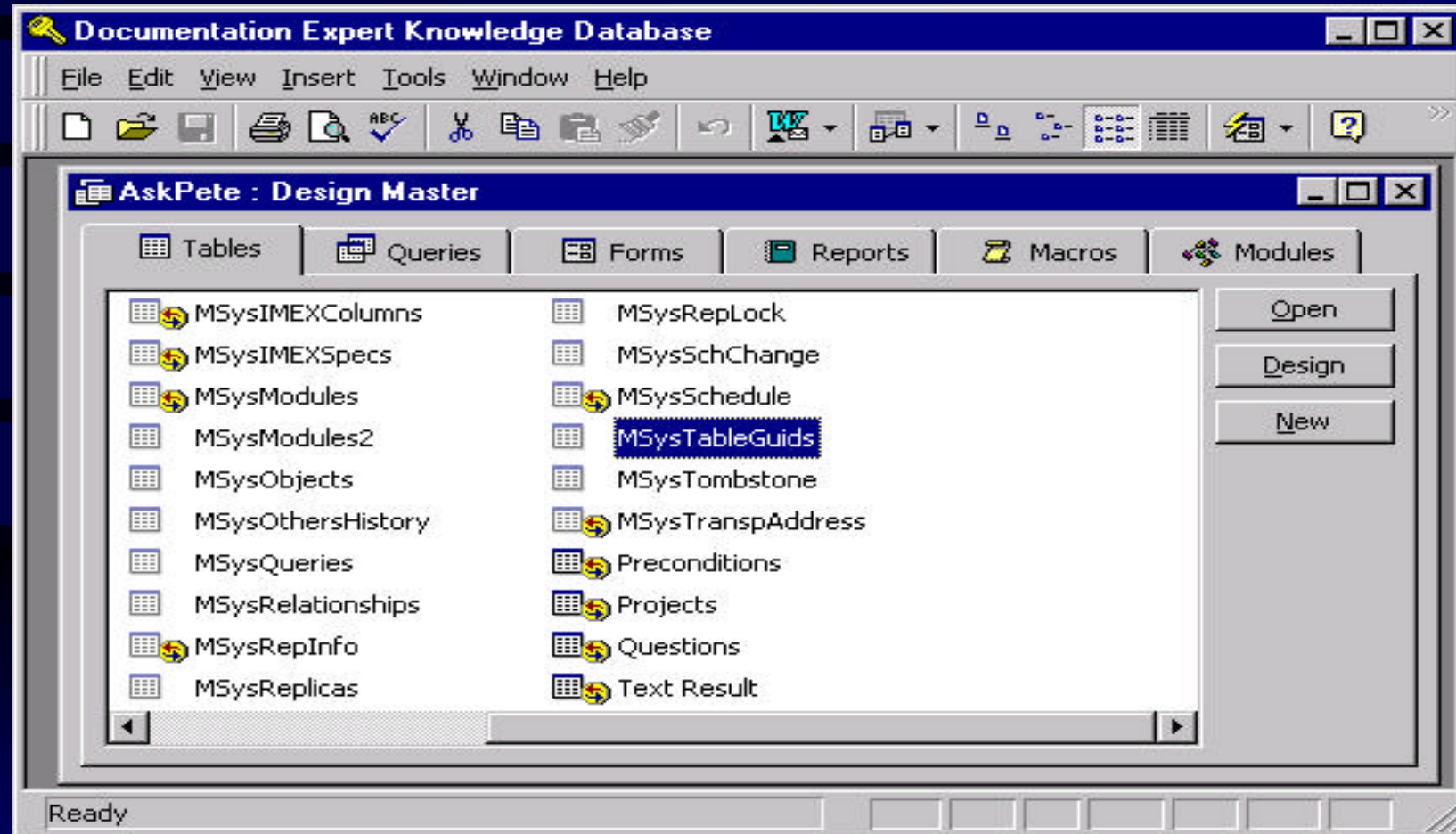
# GUI for GVM



## Issue 3: Data Consistency Management

- Data Change Detection
  - Intrusive method
    - located inside application.
    - between tool and tool database
    - between tool database and shared database
  - External method,
    - as an independent component.
    - Polling vs. trigger

# Data Monitoring: An Example



# Lessons Learned

- Political Issues to share information
- Different layers of Data Integration
  - Data schema
  - Data Format
  - Data itself
- Importance of Shared Database Utilities
  - Database comparison
  - Data mining
  - Data visualization and statistical analysis
- Easy System Configuration and Migration

# Conclusion

- IEESIM is a flexible reference architecture for enterprise-wide, shared information systems
  - *Integrated*
    - through **GVM**
  - *Extensible, Exchangeable*
    - through **XML-based Data Integration**
  - *Shared Information Mediator*
    - through **GUI/API**

# More Information

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