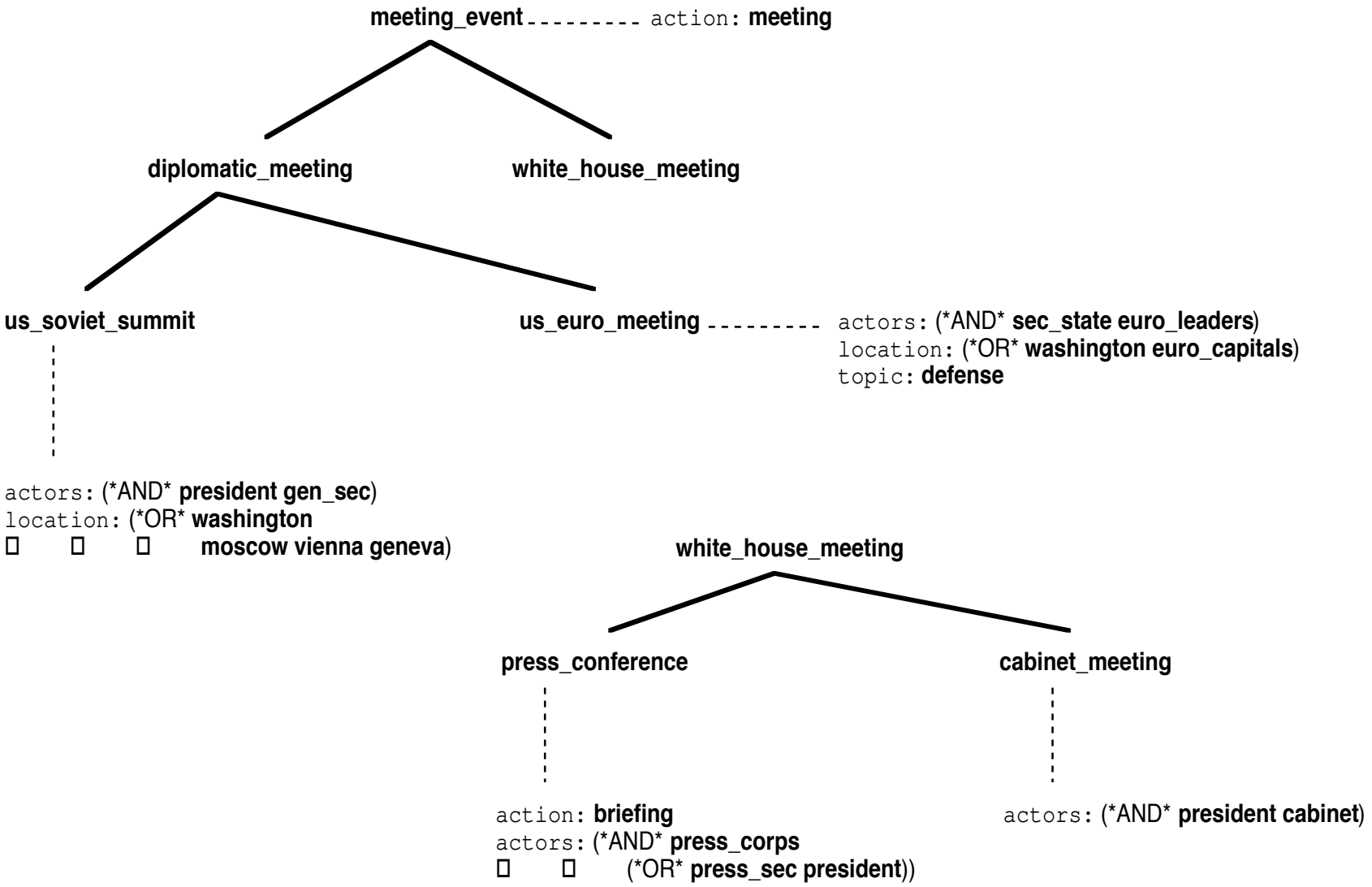
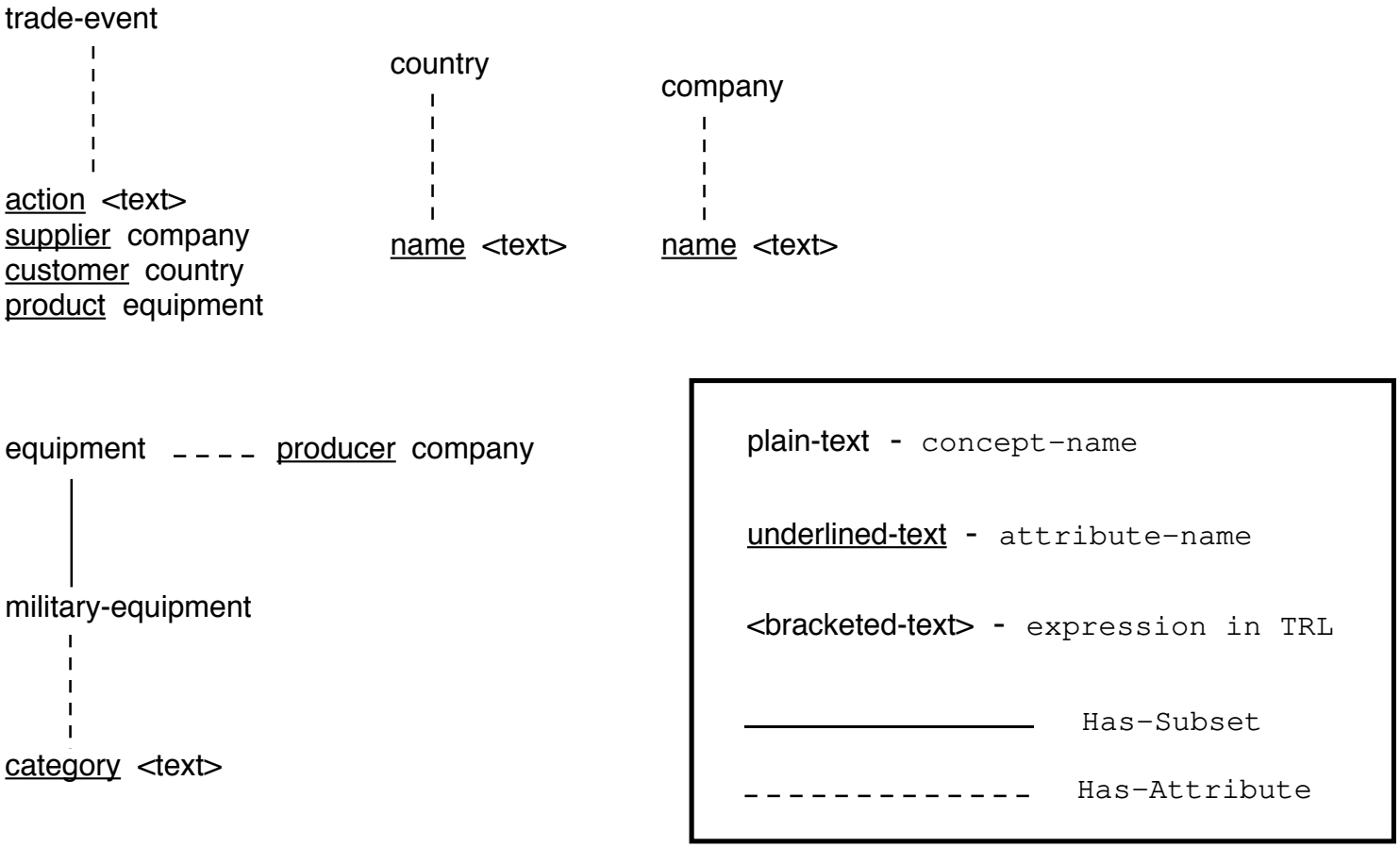
Semantic Structure



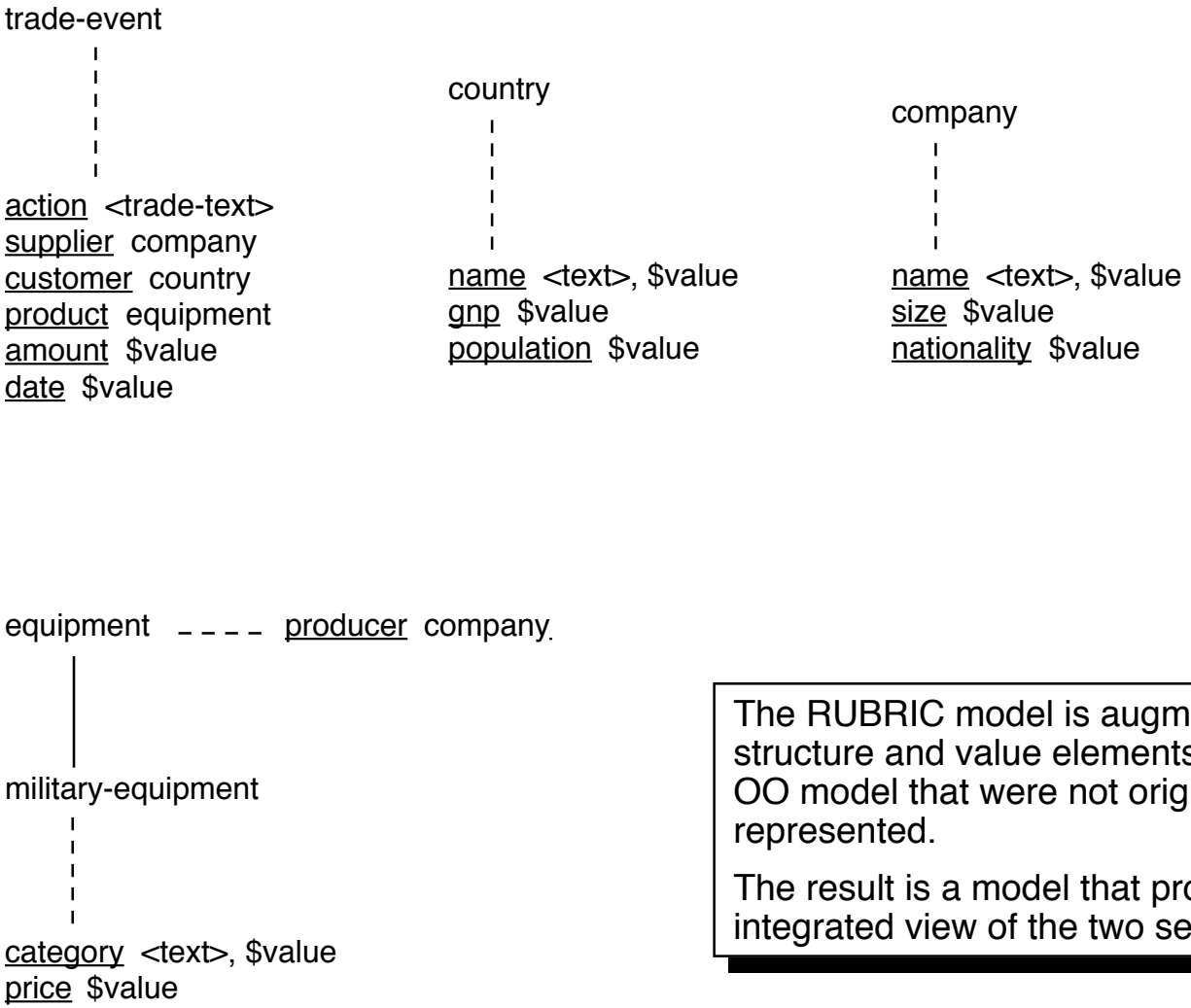
O-O Models and RUBRIC's K-R



Connecting the O-O Model to RUBRIC

- **RUBRIC's knowledge representation is concept-based and has specific features designed to support text database access.**
- **However, RUBRIC's knowledge representation is also inherently object-oriented and compatible with other object-oriented representations.**
- **The object-oriented description of the federated relational database generally contains more information than is needed for text database access.**
- **Merging the two object-oriented descriptions provides a single view of both sets of information sources.**
- **The merging can be RDB centered, TDB centered, or a coordinated process.**

Illustrative Example (cont.)



The RUBRIC model is augmented to include structure and value elements contained in the OO model that were not originally represented.

The result is a model that provides an integrated view of the two sets of sources.

Query Processing for HRDBs—The Algorithm

1. Decompose original query into its “core” concepts.
2. For each “core” concept locate the node in the RUBRIC K-B that corresponds to that concept.
3. Use the concept specification to determine the value constraints (if any) that need to be applied at the node.
4. Perform the one-to-one mapping from the node (with constraints) in the RUBRIC K-R to the OOQL of the federated database.
5. Send the OOQL query to the query router.

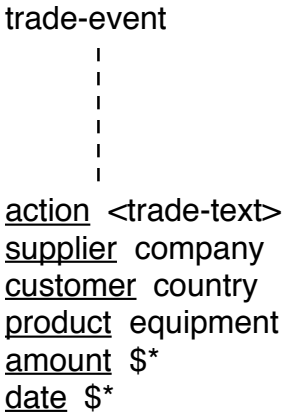
Query Decomposition—An Example

1. **Decompose original query into its "core" concepts.**

Q1: Find information on trade between North Korea and Iraq
=> trade-event from North Korea to Iraq (Q1a)
or
trade-event from Iraq to North Korea (Q1b)

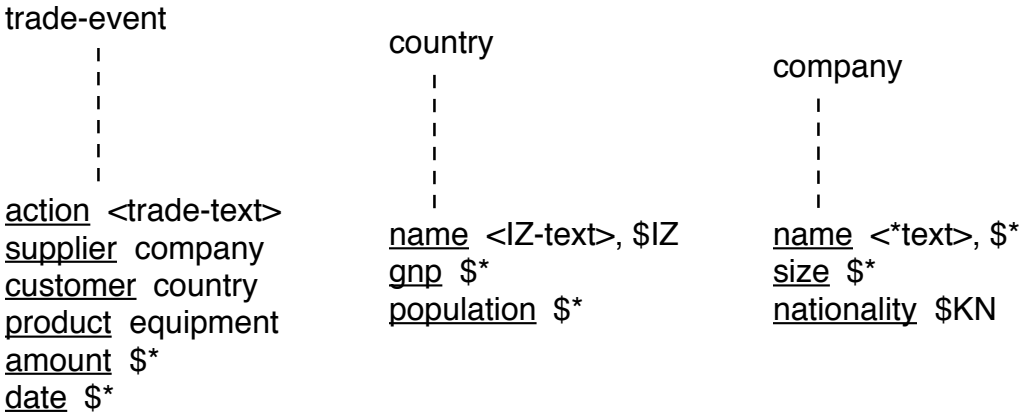
Concept Location—Example Cont.

2. **For each "core" concept locate the node in the RUBRIC K-B that corresponds to that concept.**



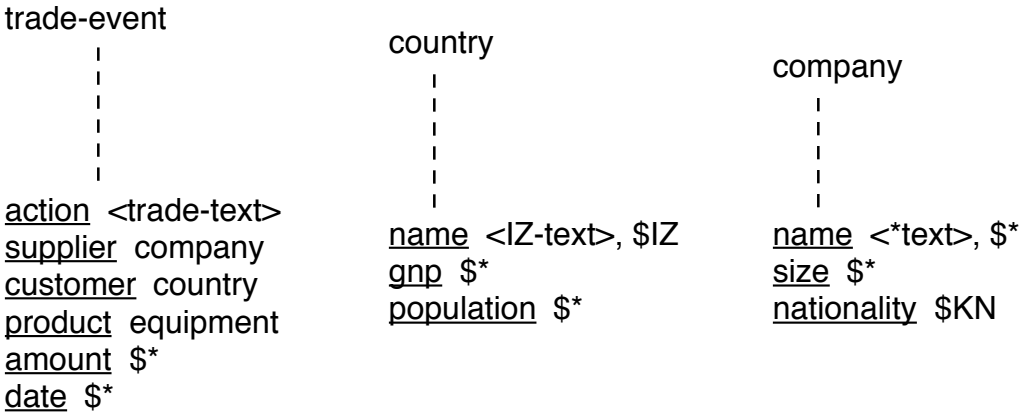
Concept Specification—Example Cont.

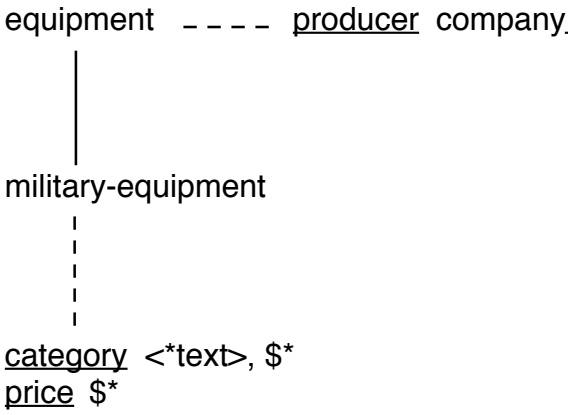
3. Use the concept specification to determine the value constraints (if any) that need to be applied at the node.



Final Query—Example Cont.

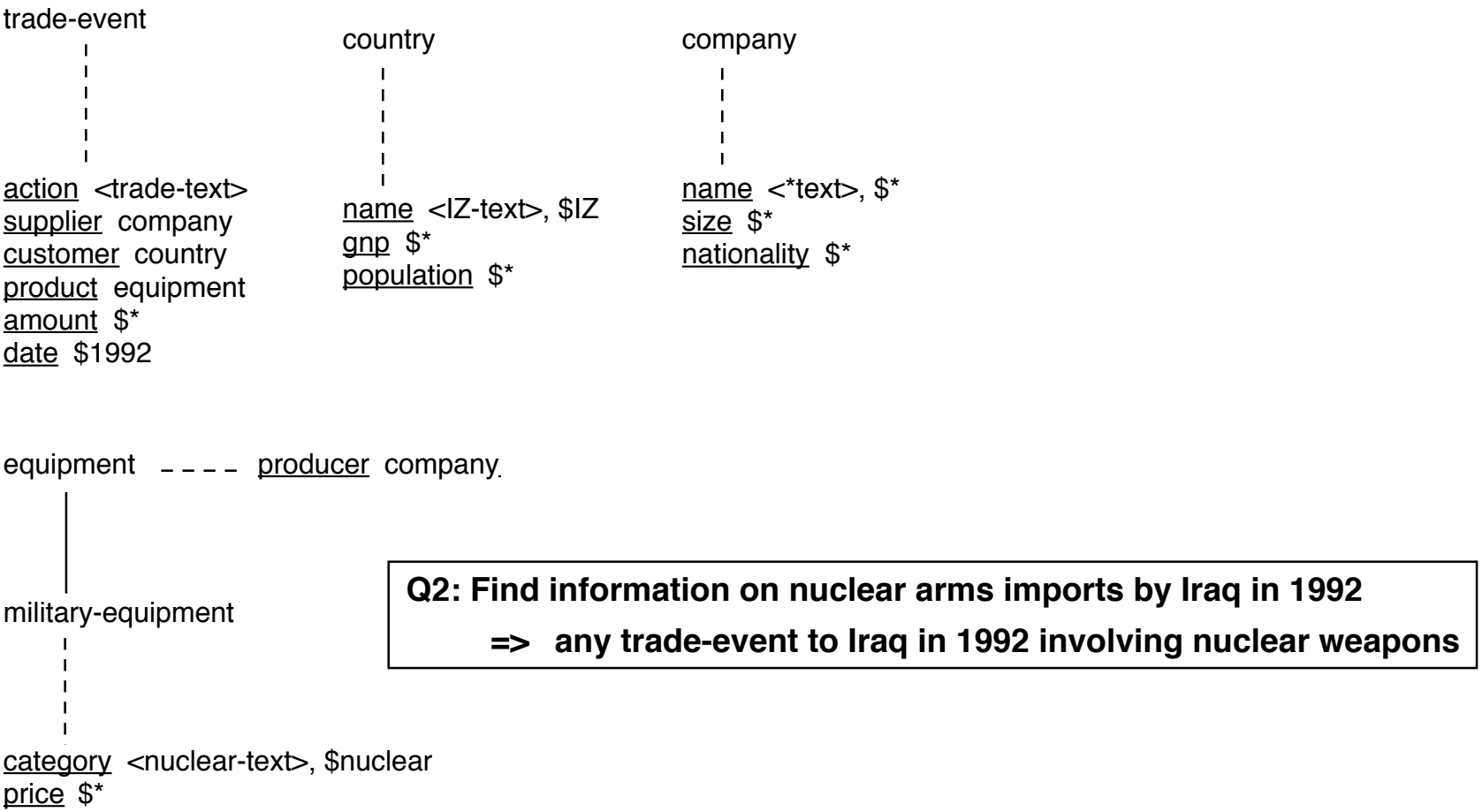
4. Perform the one-to-one mapping from the node (with constraints) in the RUBRIC K-R to the OOQL of the federated database.





Q1a: trade-event from North Korea to Iraq

Query Processing Example (cont.)



Q2: Find information on nuclear arms imports by Iraq in 1992

=> any trade-event to Iraq in 1992 involving nuclear weapons

COTS Support for Federated DBs

Vendor	Product	Comments
Sybase	OMNI SQL	Heterogeneous db access Supports several other vendors Beta test in Gov't office
Oracle	TNS + Multi Protocol Interchange	Heterogeneous