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TSpaces



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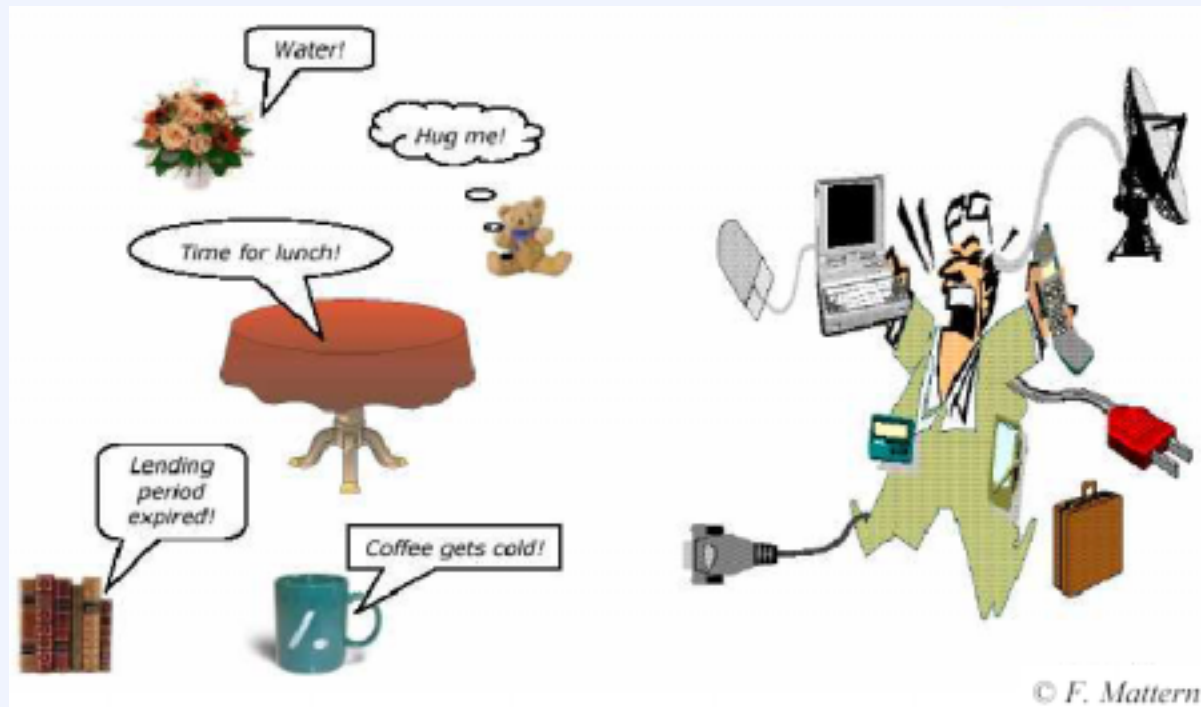
2001 Elsevier Science

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Summary

- Introduction - disparate computing
- TSpaces
- TSpaces function and usage taxonomy
- Uses of TSpaces inside of IBM
- Uses of TSpaces outside of IBM
- Criticism and perspectives

Introduction - disparate computing



How can I maintain this all?

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Introduction - disparate computing

How does the world look like?

- user's viewpoint
- provider's viewpoint

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Introduction - disparate computing

- What can we do to inter-connect the World?
 - building all software pieces as independent entities that communicate via messaging middleware.

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Introduction - disparate computing

- Why middleware?
 - Independent testing, maintaining and improvement
 - Opportunity for adding translators to the communication stream that fix protocol
 - Flexibility without having to completely rewrite current software systems

TSpaces

Intelligent Connection-ware



<http://www.almaden.ibm.com/cs/TSpaces/>



TSpaces

- IBM Almaden Research Center project
- Decendant of the Linda system at Yale University
- Messaging middleware
- Asynchronous messaging
- Database features
- Written in Java
- different style of multipoint communication

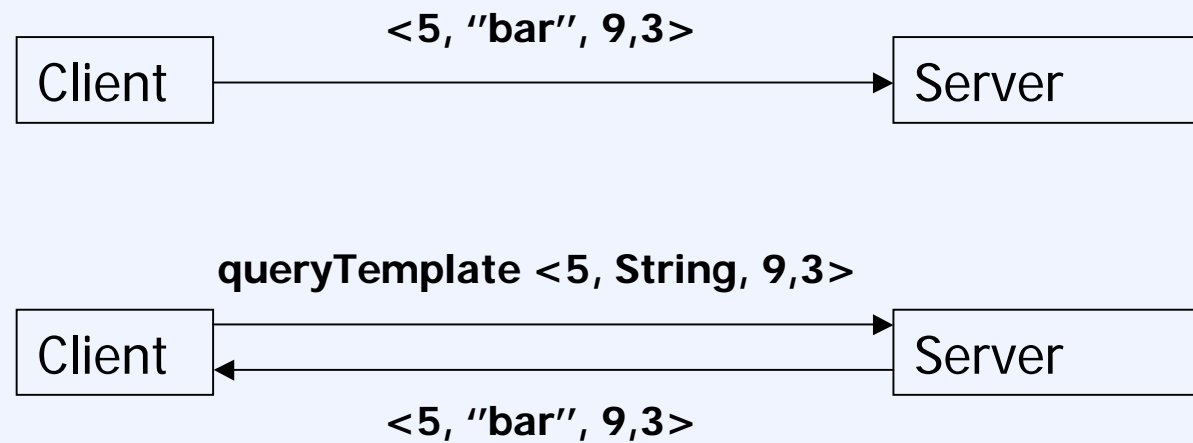
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TSpaces

- Tuples are the basic data structure (integer, string, float, multi-dimensional array, Java object, Java class).
- Spaces are simply collections of tuples
- Tuple requests - queries.

Example

Query



Basic TSpaces operations(1)

- **write (tuple)**: Adds a tuple to the space.
- **take(template_tuple)**: Searches for a tuple that matches the template. When found, the tuple is removed from the space and returned. If none is found, returns null.
- **waitToTake(template_tuple)**: Searches for a tuple that matches the template. Blocks until match is found. Removes and returns the matched tuple from the space.
- **read(template_tuple)**: Like "take" above, except that the tuple is not removed from the tuple space.



Basic TSpaces operations(2)

- **waitToRead(template_tuple)**: Like "waitToTake" above, except that the tuple is not removed from the tuple space.
- **scan(template_tuple)**: Like "read" above, except that it returns the entire set of tuples that match.
- **countN(template_tuple)**: Like "scan" above, except that it returns the number of matching tuples rather than the set of tuples itself.

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A simple usage taxonomy(1)

- Heterogeneous message system
- Event mechanism for heterogeneous platforms and disparate devices
- Load sharing or load balancing
- Object database, semi-structured database or transaction system

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A simple usage taxonomy(2)

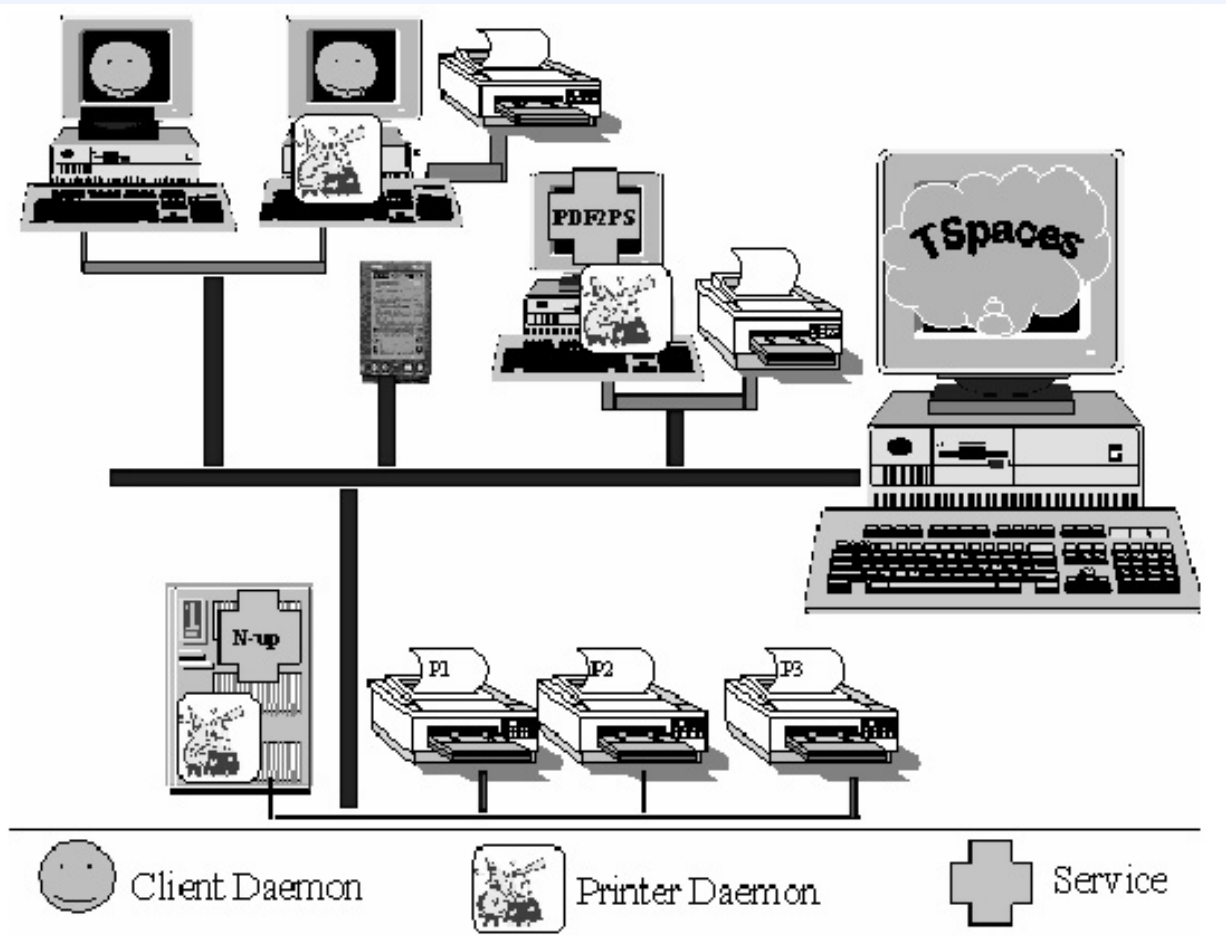
- Gateway and host for transcoders
- Local network controller
- An XML Store
- A service discovery mechanism



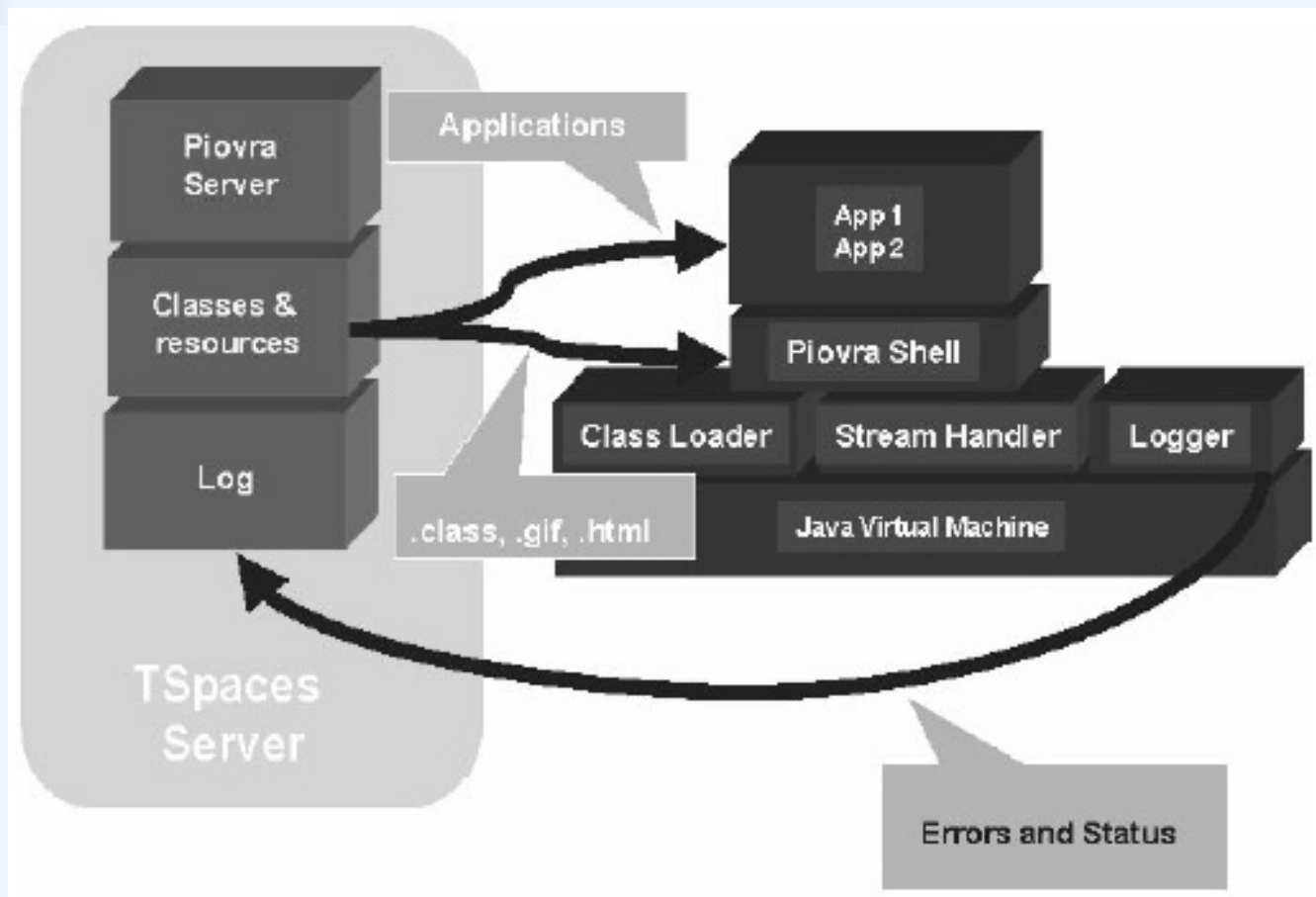
TSpaces

Uses of TSpaces inside of IBM

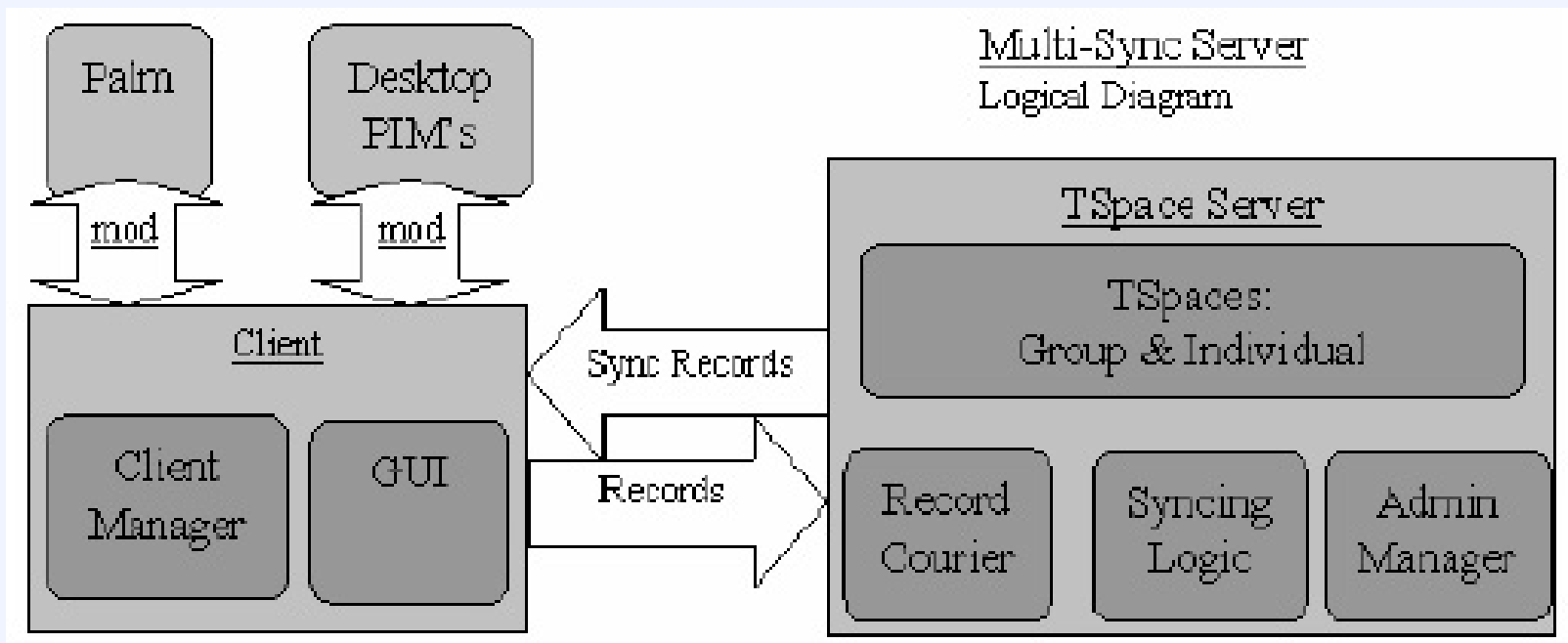
A universal print solution



PIOVRA - an application launcher



Multi-sync server

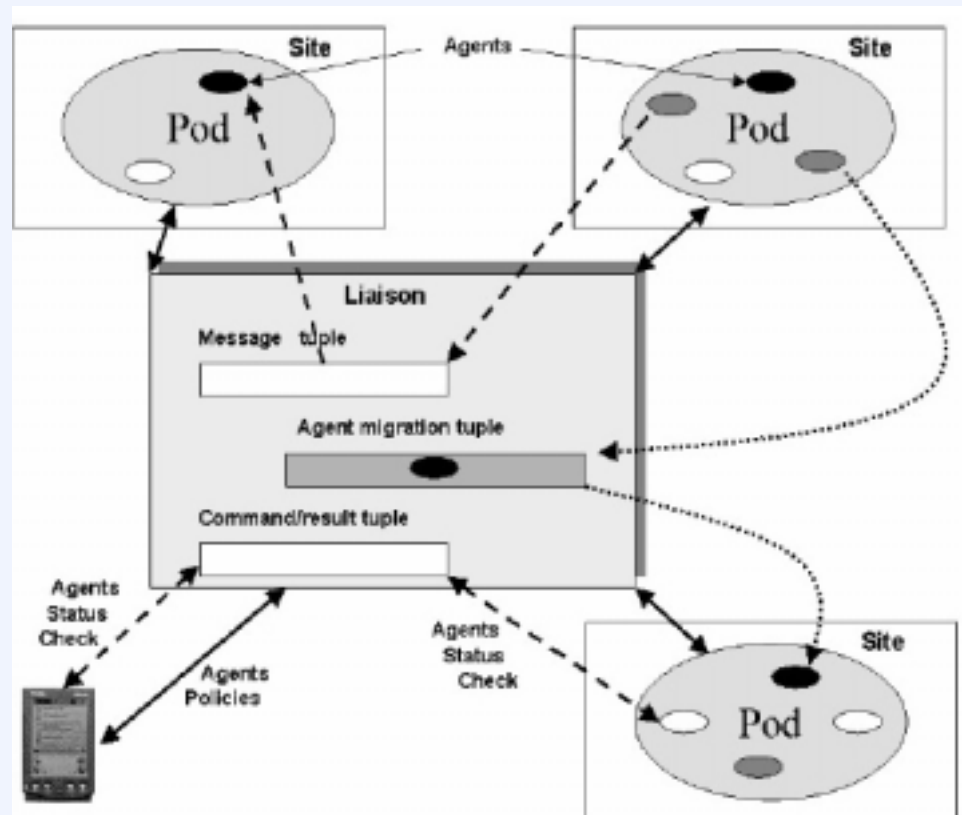




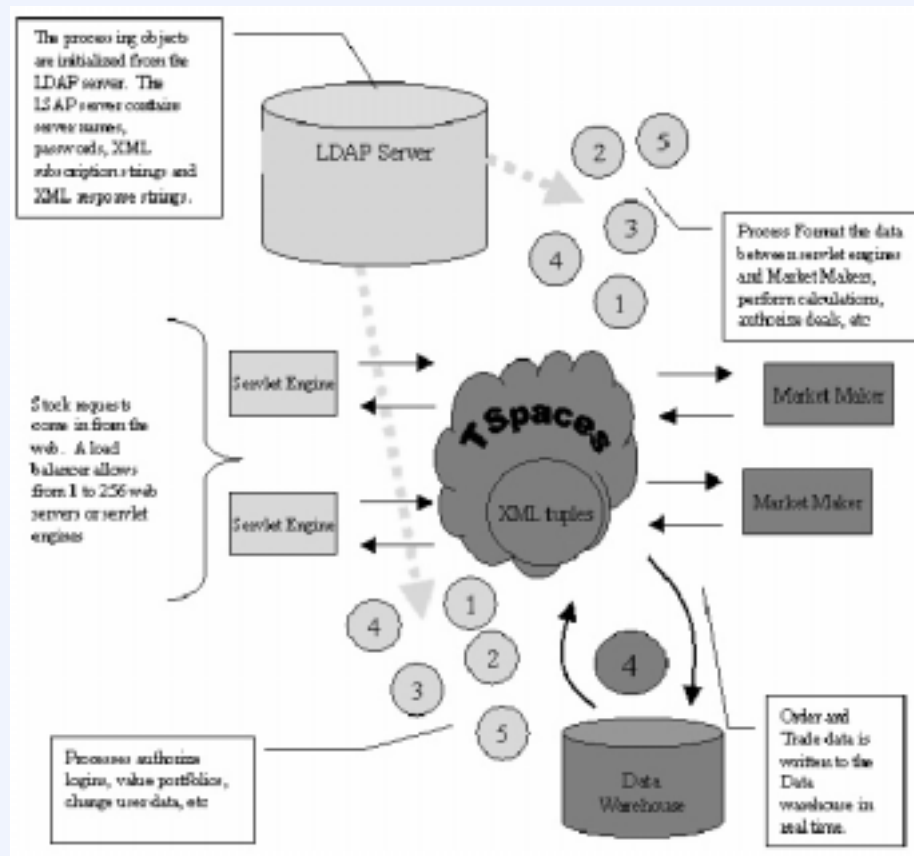
TSpaces

Uses of TSpaces outside of IBM

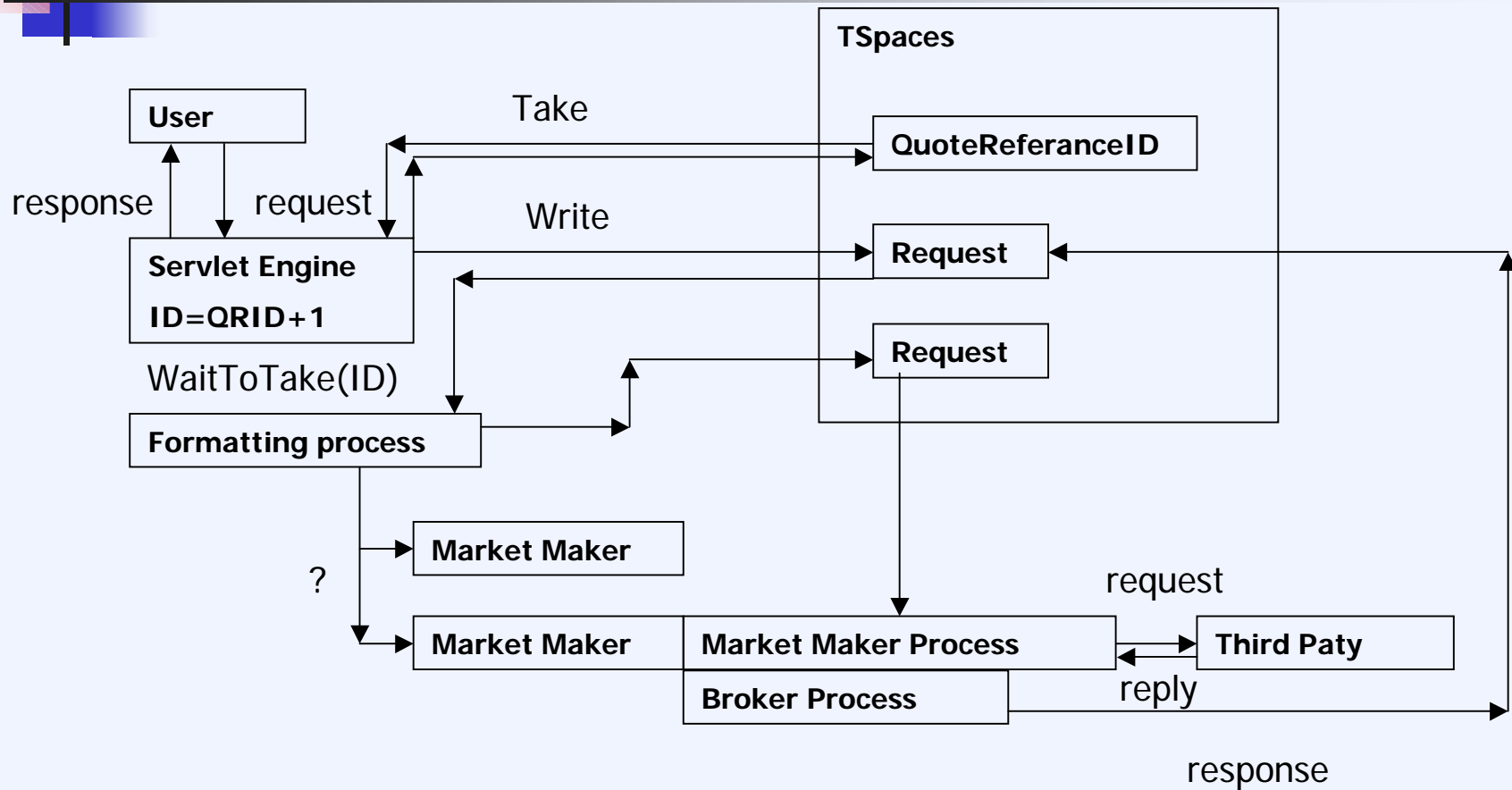
Motorola's Mojave system - mobile agents for wide-area systems management



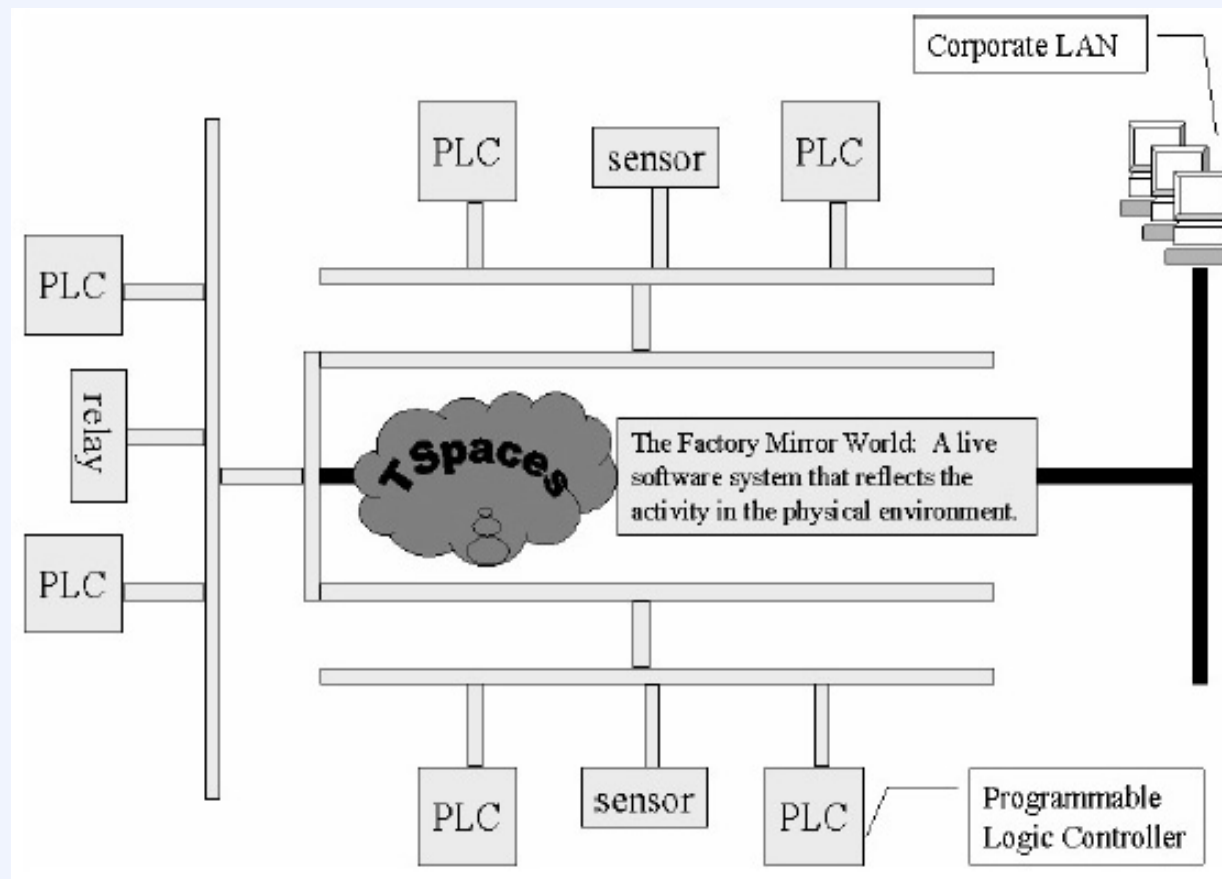
Brokerage systems and services - an XMLbased equity trading solution



User requesting a price quote on a stock



Cyberonix - ECP creates a true mirror world



Criticism and perspectives

- Positive criticism:
 - Breakthrough communication middleware
 - Database functionality
 - Asynchronous messaging
 - XML support
 - Flexible for different usages

Criticism and perspectives

- Negative criticism:
 - Incompatible with the lower versions
 - Security

Criticism and perspectives

- Perspectives:
 - Revised Transaction and Locking code
 - XPath for XML document selection
 - Regular expressions for string matching
 - HTTP Server revision
 - Secure Object Support
 - Expired Tuple Notification

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Questions ?

