

JXTA : A Recently Proposed Platform for P2P Network

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Outline

- The problem of p2p network
- Why JXTA?[5]
- The architecture of JXTA [6]
- The six protocols in the core layer[2][5]
- JXTA virtual network [1]
- Application on JXTA[3]
- Conclusion

The Problem On P2P System

- Flooding

Solution: group[1][5]

- Efficiency

Solution: searching service[6]

- Security

Solution: JVN[1][4]

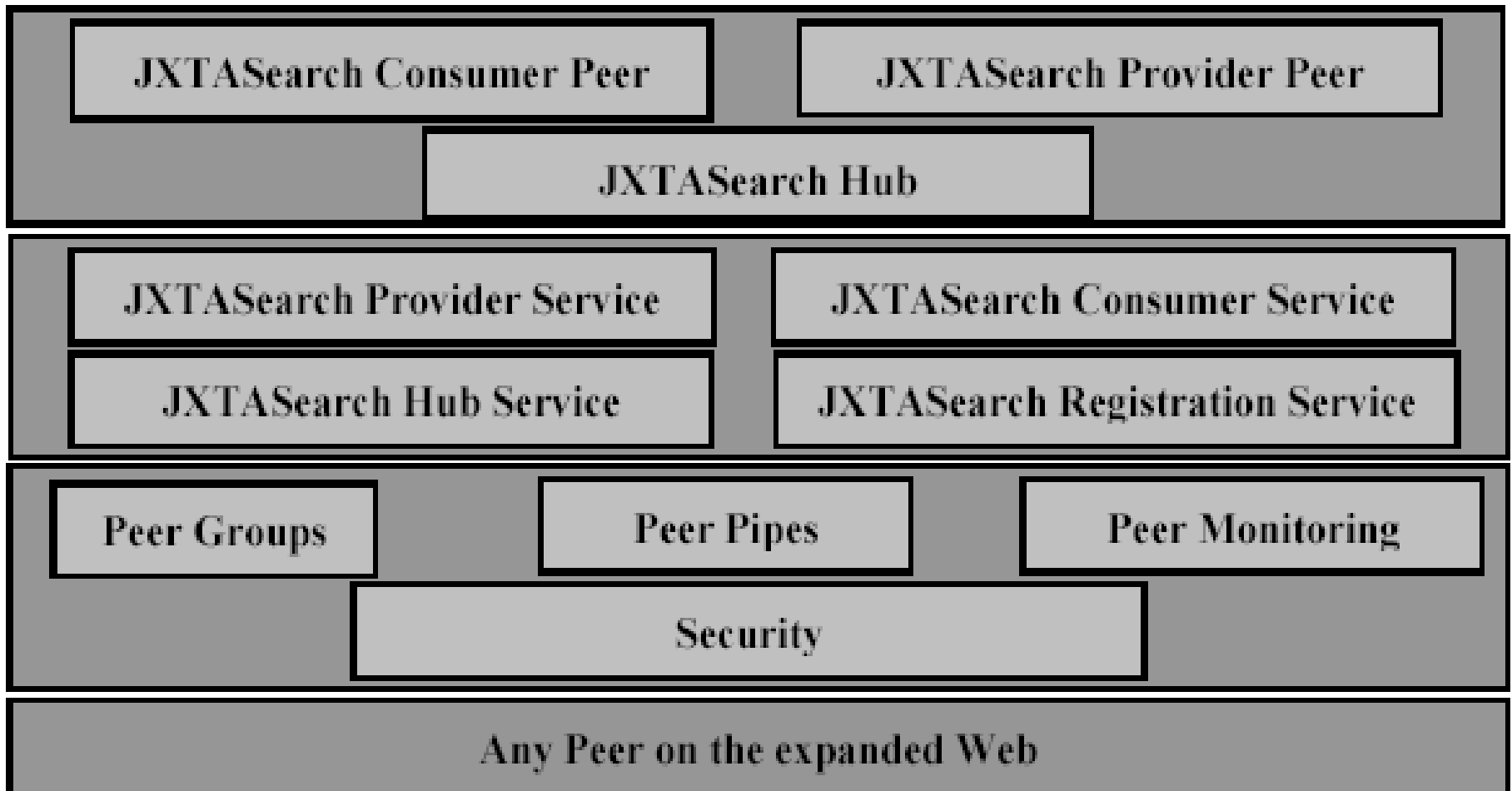
Why JXTA ?

- Designed for p2p network
- Enable all connective device on the network
(cell phone, PC, PDA, server) → as peers
- To build interoperable service and application

The Architecture of JXTA

- JXTA core layer :
 - Basic operation (communication)
 - Provides six protocols
- JXTA services layer :
 - Higher level functions (searching)
- JXTA applications layer :
 - Use peer services

The Architecture of JXTA



JXTA Protocol

- Peer Endpoint Protocol (PEP)

Routing protocol of JXTA

A peer can discover a route used to send message to another peer

Example :

$A \rightarrow B$

$A \rightarrow \text{intermediate peer} \rightarrow B$

JXTA Protocol

- Peer Resolver Protocol (PRP)

A query-response protocol

A peer can send a query to one or many peers

Example :

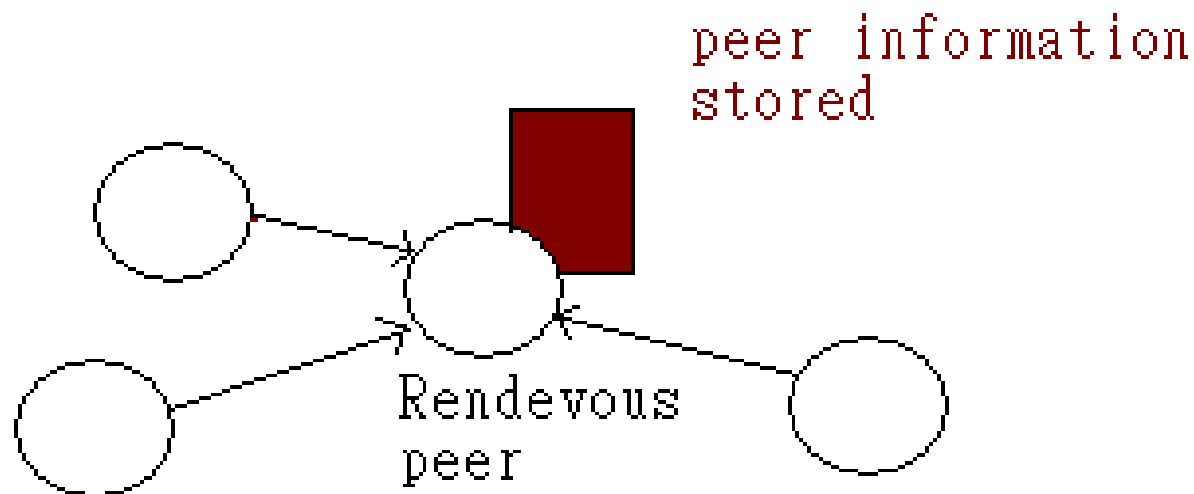
A sends a query message to B, C, D

C sends response message

JXTA Protocol

- Peer Discovery Protocol (PDP)
 - To discovery any published resources
 - Based on the use of the rendezvous peers
 - Rendezvous peers have all peer properties

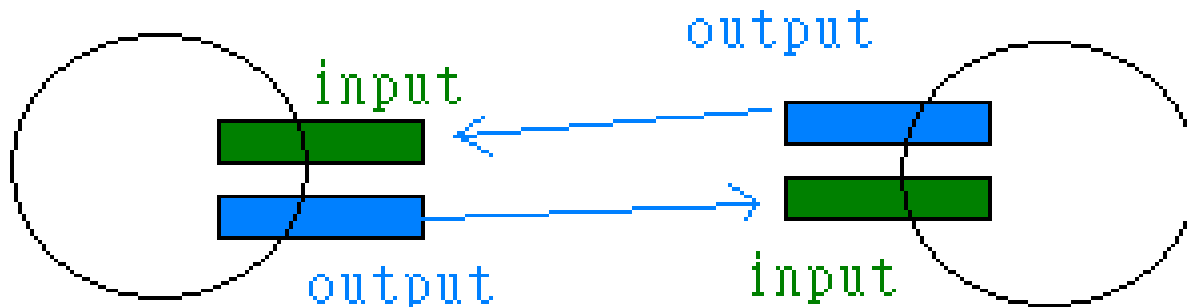
Example:



JXTA Protocol

- Pipe Binding Protocol (PBP)
To establish pipe (virtual communication channel) connection between peers
Pipe provide foundation communication mechanism between peers

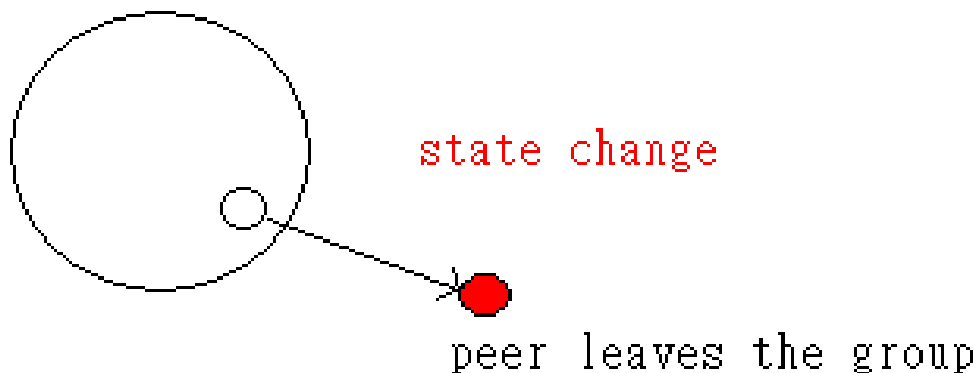
Example:



JXTA Protocol

- Peer Information Protocol (PIP)
To exchange status information between peers
The information includes uptime, traffic load, state

Example:



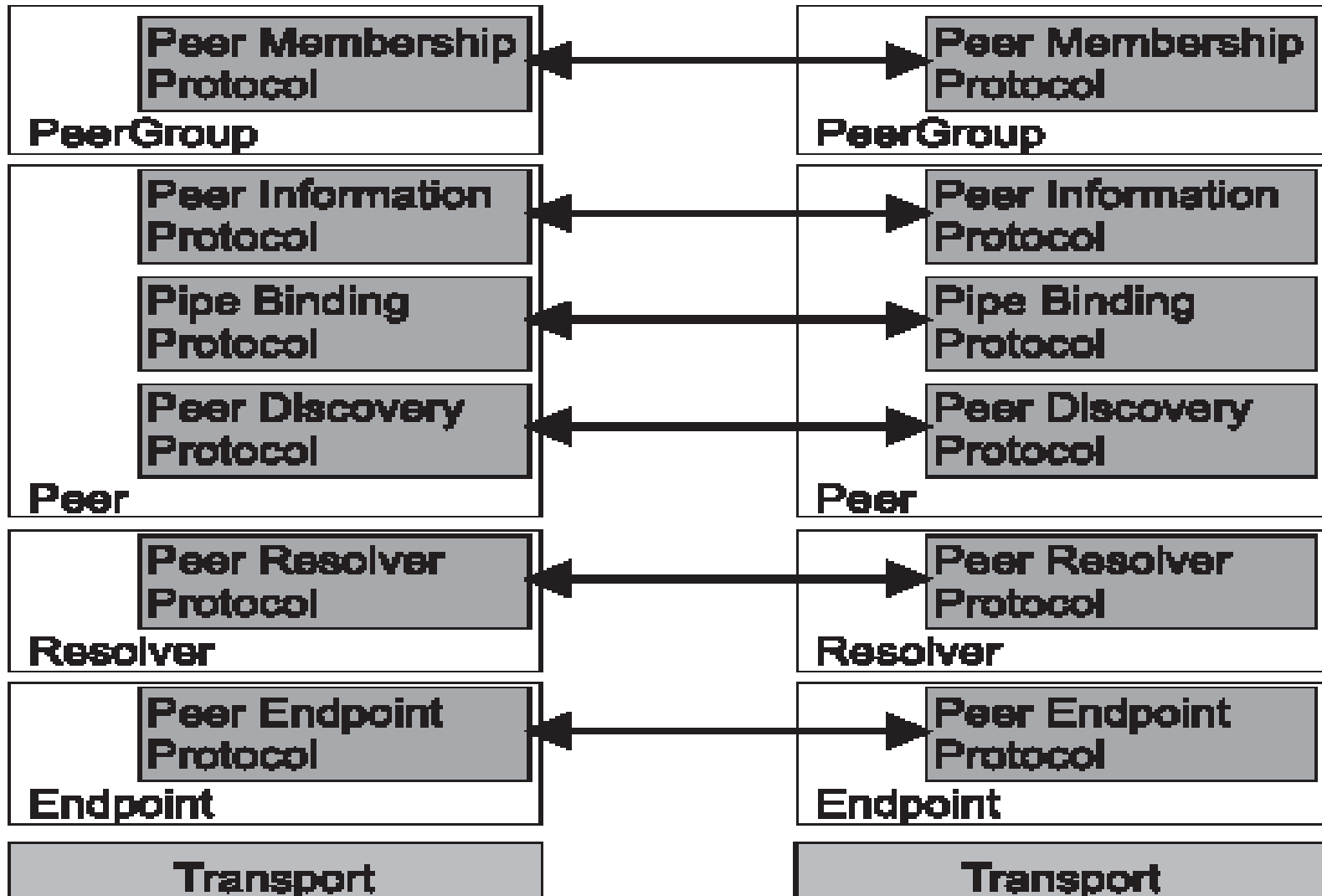
JXTA Protocol

- Peer Membership Protocol (PMP)
The mechanism that which peers can organize themselves to form groups
Peers use the PMP to join or leave a group

Example:



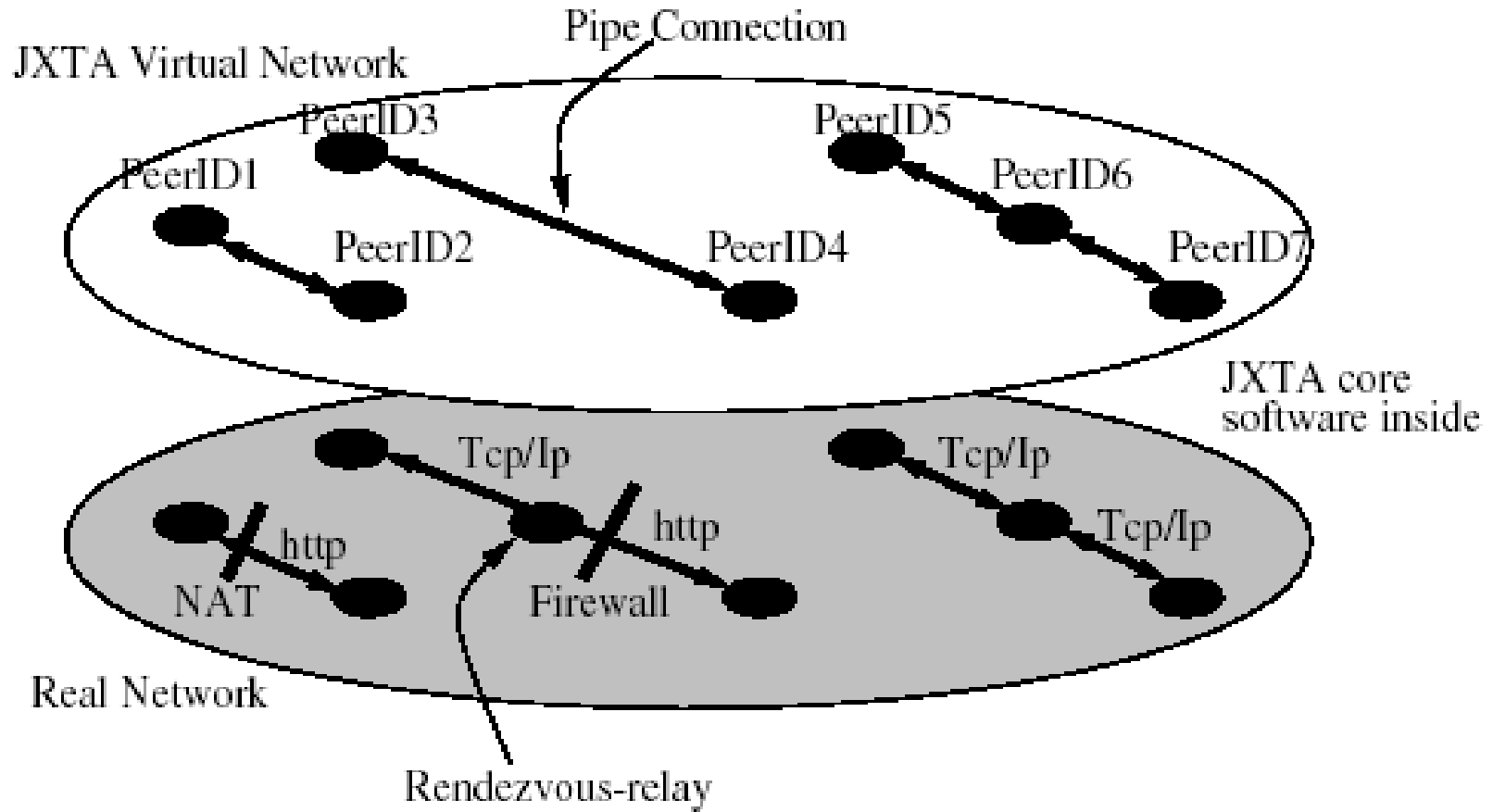
JXTA Protocol



Peer Group

- Peers that have a common set of interests form a group
- A peer may belong to many groups
- A group can decide to accept or reject a join peer

JXTA Virtual Network (JVN)

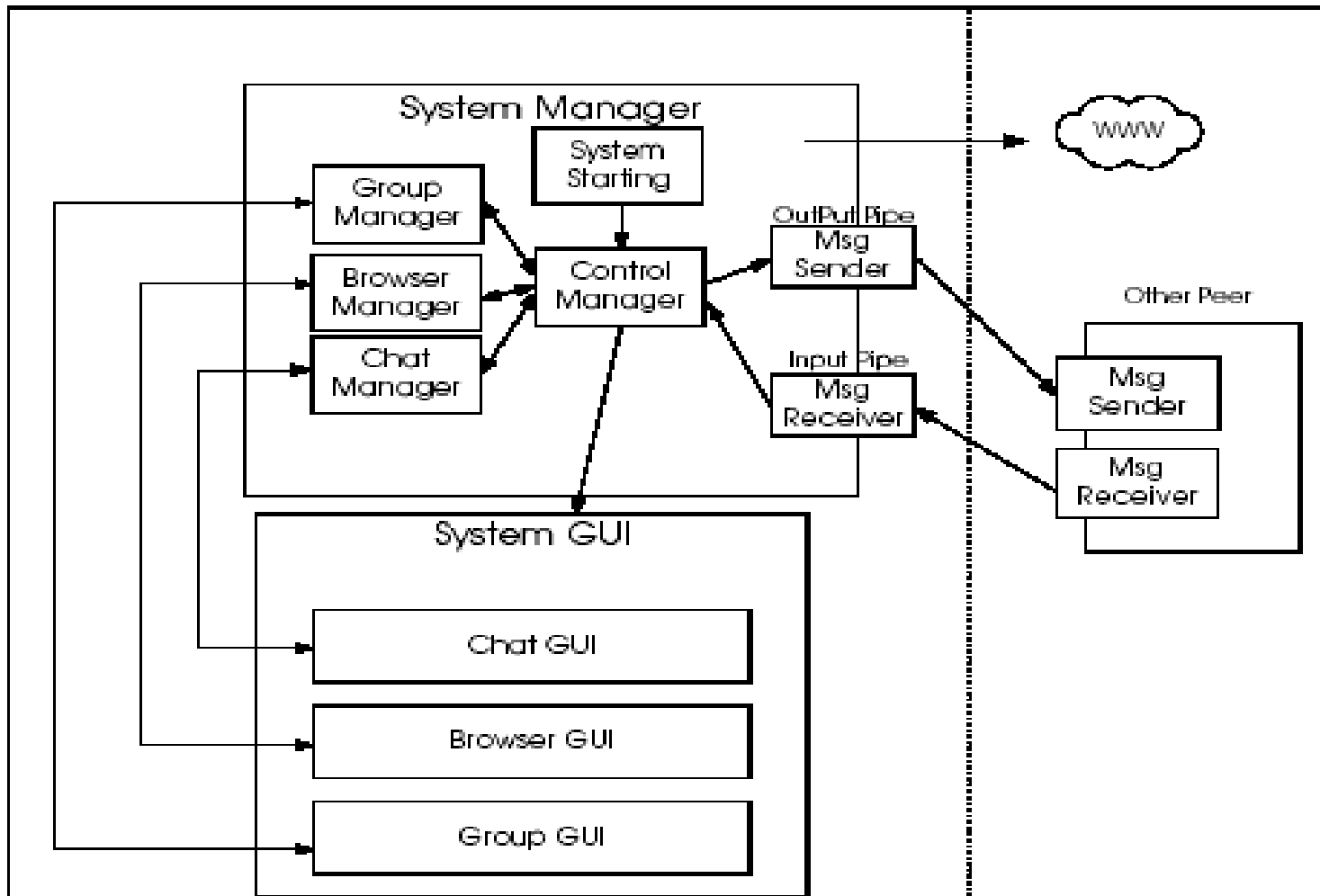


JXTA's Features

- Peers, pipes
- Groups, superpeers → reduce searching depth
- XML-based publish/subscribe mechanism
- Reduce the network bandwidth

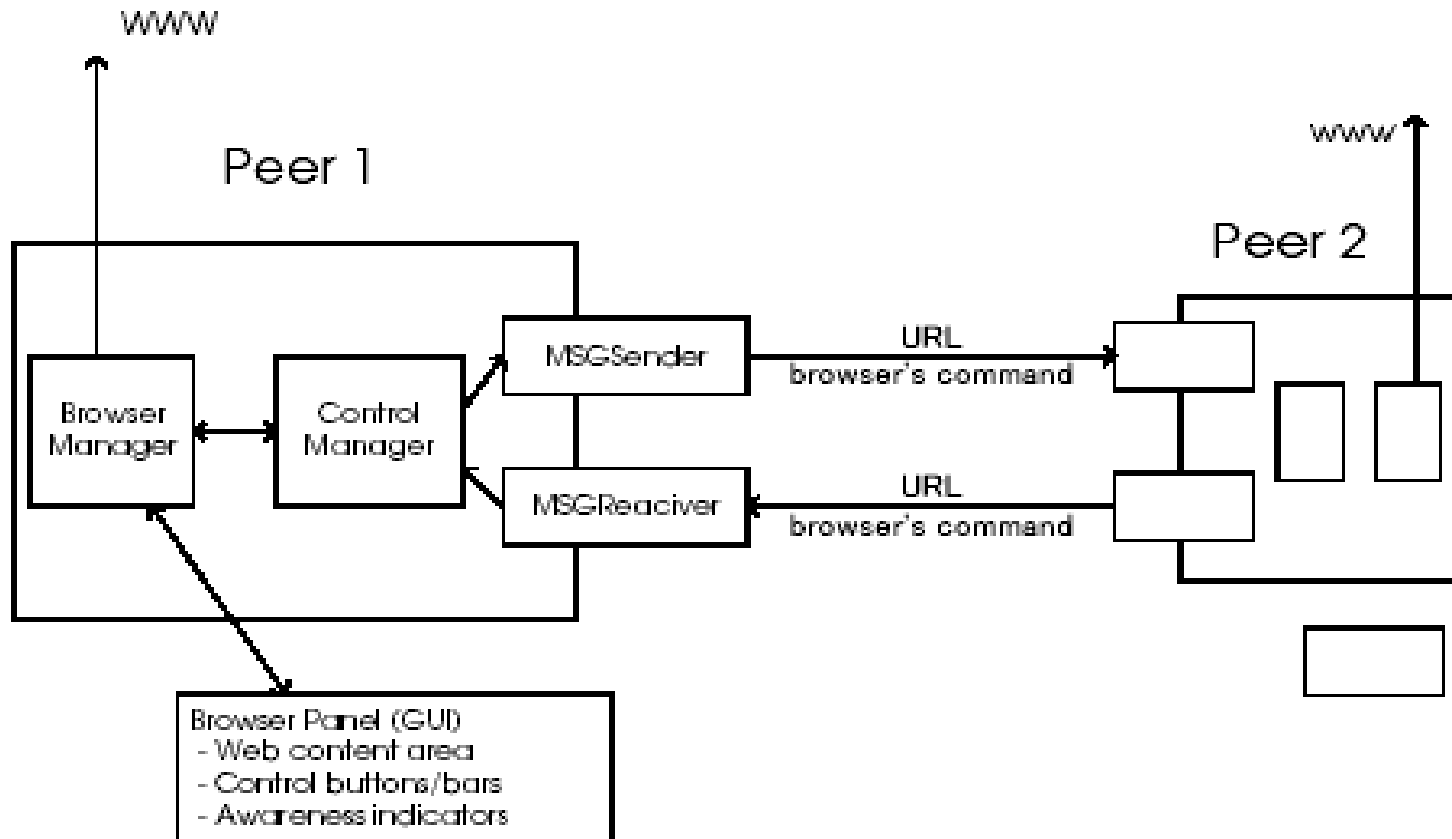
Application

- P2P Shared Browser System:[3]



Application

- Function modules [3]



Conclusion

- JXTA has the following features :
 1. Interoperability [4]
 2. Platform independence
 3. Ubiquity

Such features solve the shortcomings of current p2p systems.

References

- [1] Rita Yu Chen and Bill Yeage , “Java Mobile Agents on Project JXTA Peer-to-Peer Platform “ , Proceedings of the 36th Hawaii International Conference on System Sciences (HICSS’03).
- [2] Nico Maibaum, Thomas Mundt, “JXTA: A Technology Facilitating Mobile Peer-To-Peer Networks” , Proceedings of the International Mobility and Wireless Access Workshop (MobiWac’02).
- [3] Mikito Nakamura, Jianhua Ma, Katsuhiko Chiba, Makoto Shizuka, Yoichiro Miyosh, “Design and Implementation of a P2P Shared Web Browser Using JXTA “ , Proceedings of the 17 th International Conference on Advanced Information Networking and Applications (AINA’03).
- [4] William Yeager, Joseph Williams, ” Secure Peer-to-Peer Networking :The JXTA Example”, March | April 2002 IT Pro.
- [5] JXTA v2.0 Protocols Specification, Project JXTA <http://www.jxta.org>
- [6] Changtao Qu, Wolfgang Nejdl, “Exploring JXTA Search for P2P Educational Media Discovery “ , Proceedings of the IEEE Workshop on Knowledge Media Networking (KMN’02).