

JXTA Overview

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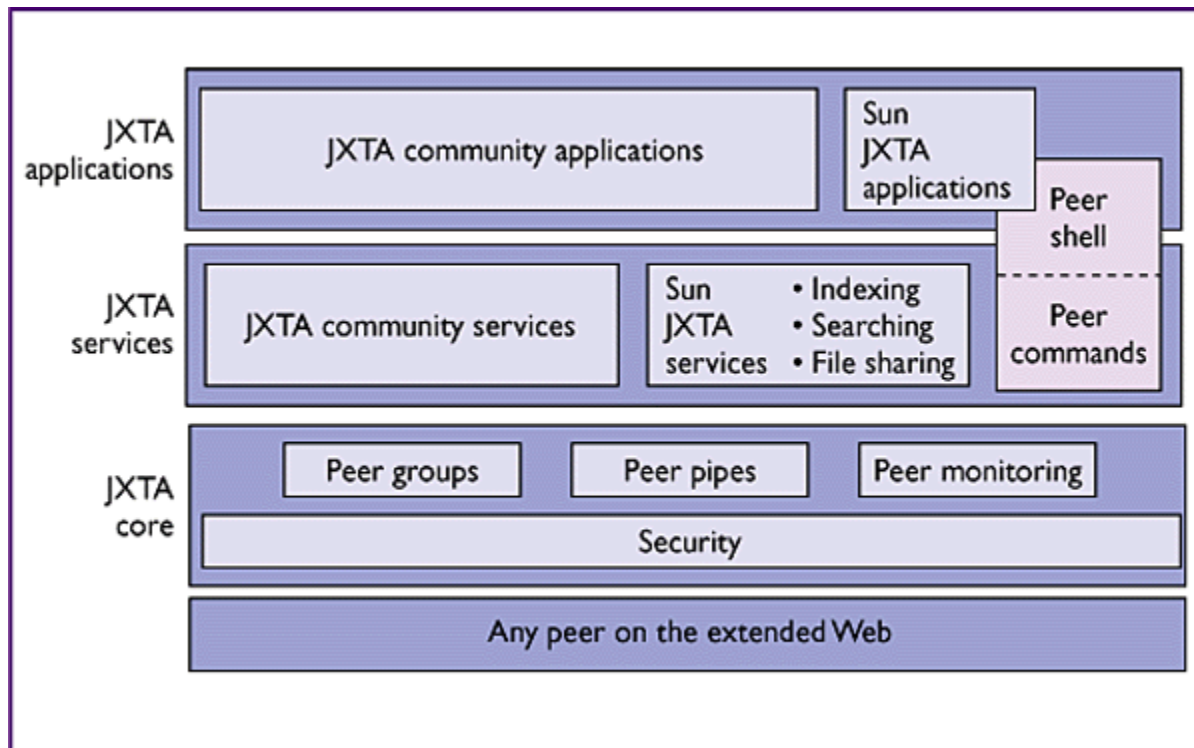
Objectives

- JXTA ("juxta") was designed to permit implementation of P2P applications using Java.

Characteristics

- *Interoperability*: Enable peers to find and communicate with each other.
- *Platform independence*: Independent of programming language, platform, network technology.
- *Ubiquity*: designed to be implemented on every device (PDAs, servers, etc.).

Architecture



- Core: manages communication and peer establishment.
- Middle: handles services (indexing, searching, file sharing).

JXTA Objects and Details

- Each peer is given a 128-bit (not guaranteed to be globally) unique identifier.
- **Advertisements**: XML documents describing existence of peers, peer groups, pipes, or services.
- **Peer**: entity that understands all required protocols.
- **Messages**: base unit of communication, composed of an envelope and a body. Should operate on asynchronous, unreliable, uni-directional transport.
- **Peer Group**: virtual entity that "speaks" the set of peer group protocols. The World Peer Group includes all.
- **Pipes**: communication channels for sending and receiving messages. Unidirectional and asynchronous, their endpoints can be moved among peers.
 - **Point-to-Point Pipe**: connects exactly two peers.
 - **Propagate Pipe**: connects multiple peer endpoints.

Protocols

- **Peer Discovery**: allows peers to find advertisements on other peers; used to find peers, peer groups, advertisements.
- **Peer Resolver**: allows a peer to send and receive generic search queries.
- **Peer Information**: allows a peer to learn capabilities and status of other peers.

- **Peer Membership:** allows a peer to fetch membership requirements, and apply for, update, or cancel memberships.
- **Pipe Binding:** allows a peer to bind a pipe advertisement to a pipe endpoint; indicates where messages actually go when traversing a pipe.
- **Endpoint Routing:** allows a peer to query a peer router for available routes in order to send a message to a destination peer.

Discovery Mechanisms

- LAN-based: broadcast.
- Peer can receive invitation message that tells about other peer.
- Peer A can query another peer B about the peers that B knows about.
- Rendezvous peer can act as source of information (directory) about peers.

Security

- Hash, symmetric (RC4) and assymetric (RSA) algorithms.
- PAM-like authentication framework.
- Password-based login scheme.
- Access control mechanism based on peer groups, where members share everything.
- Transport mechanism based on SSL/TLS.

Adapted from Jose M. Vidal (<http://jmvidal.cse.sc.edu/talks/jxta/>).