

JXTA



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Motivation

Plate-forme ouverte de développement P2P

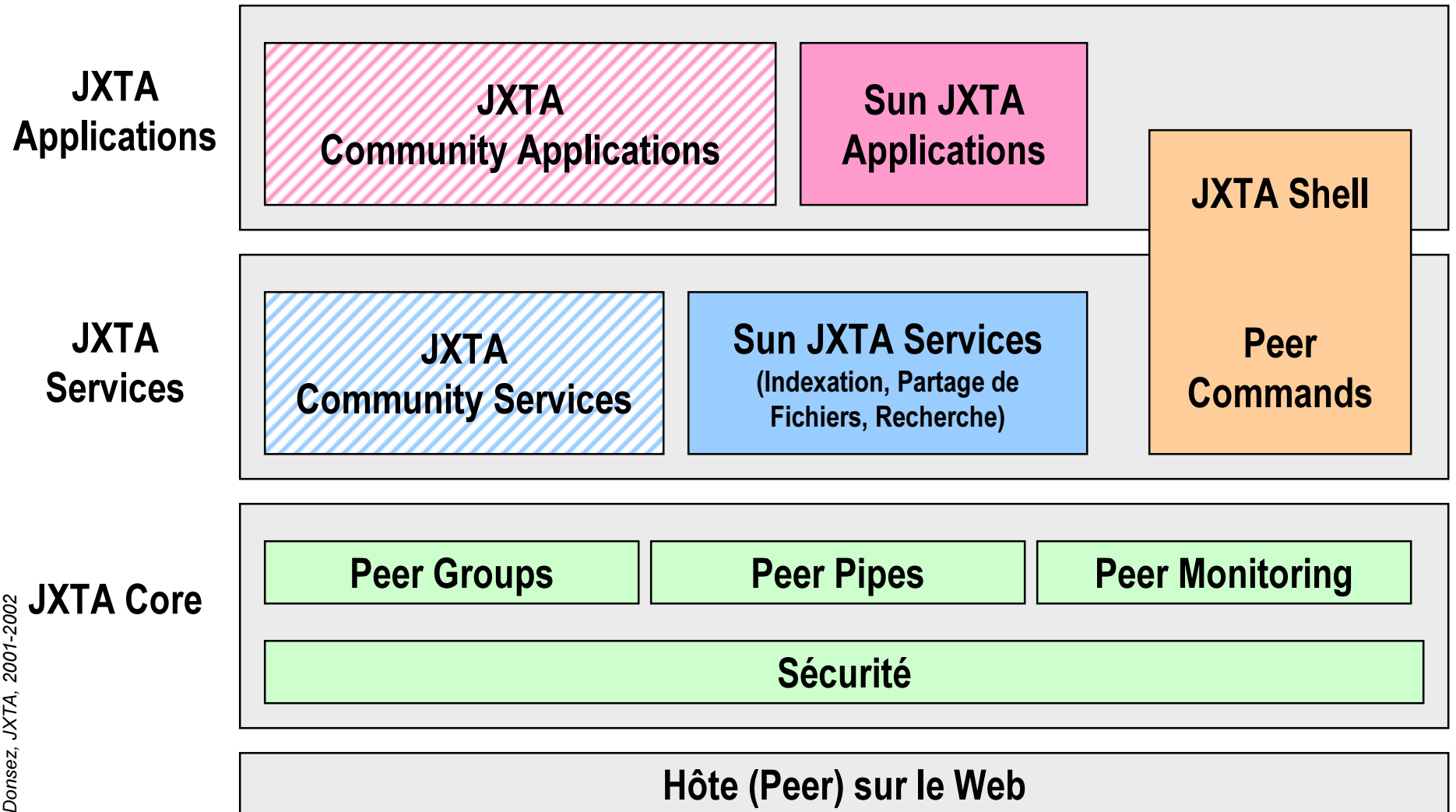
■ P2P :

- Informatique Grand Public
 - Terminal (PC)
 - Connexion quasi permanente (Forfait ADSL, Modem Cable, ...)
 - Usage
 - A la fois client
 - A la fois serveur (de ressources)
- Exemple
 - Calcul massivement distribué
 - SETI
 - Partage de fichiers
 - Napster, GnuTella, FreeNet, Gnapster, Publius
 - Plate-forme de développement
 - JXTA

■ JXTA, Sun (prononcé « Juxta(pose) »)

- Pour des Java device (mais également non Java)

Architecture



JXTA Core

■ *Peer groups*

- establish a set of peers and naming within a peer group
 - with mechanisms to create policies for creation and deletion, membership, advertising and discovery of other peer groups and peer nodes, communication, security, and content sharing.

■ *Peer pipes*

- provide communication channels among peers.
- Messages sent in peer pipes are structured with XML, and support transfer of data, content, and code
 - allowing a range of security, integrity, and privacy options.

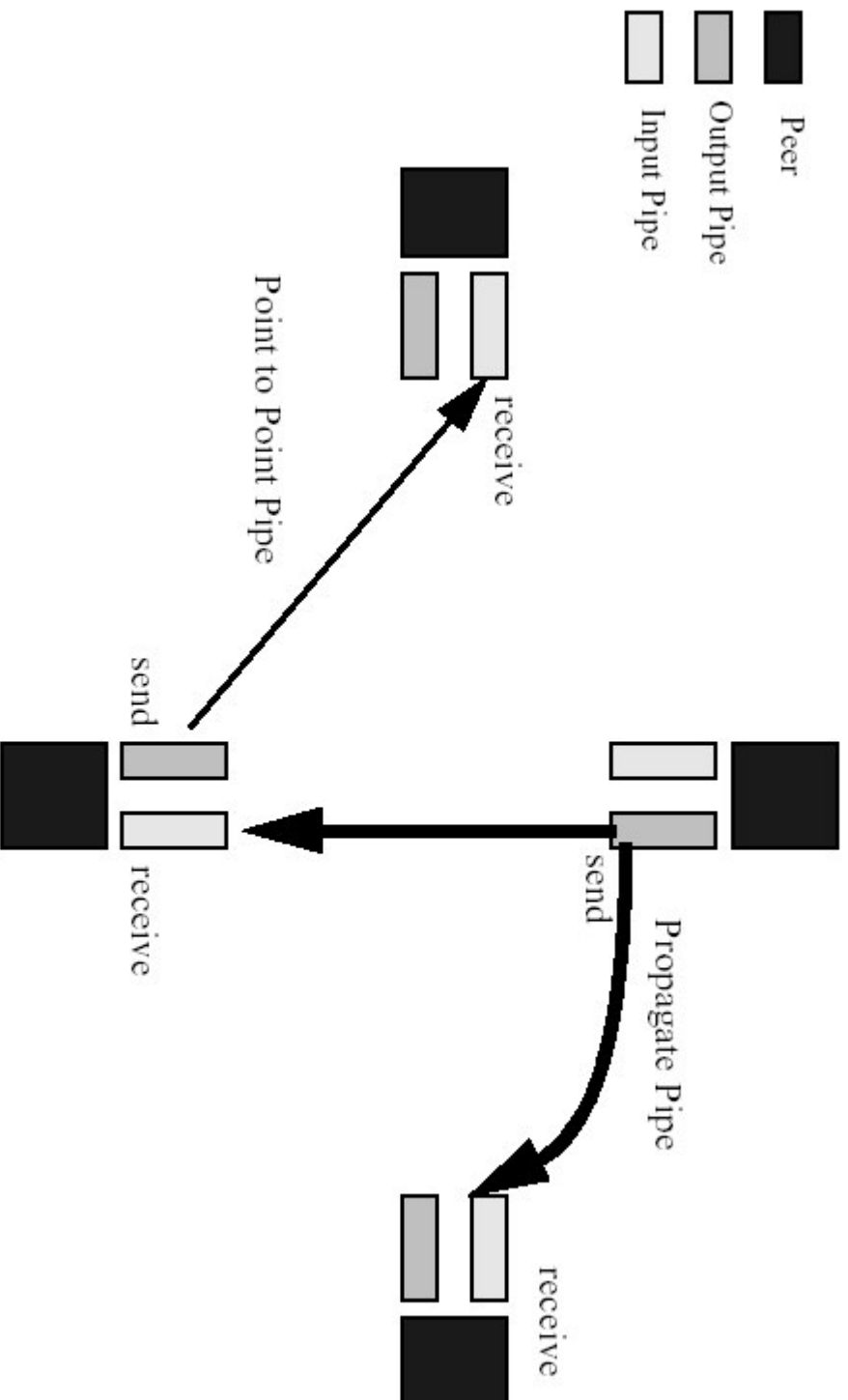
■ *Peer monitoring*

- enables control of the behavior and activity of peers in a peer group
 - can be used to implement peer management functions including access control, priority setting, traffic metering, and bandwidth balancing.

■ Supports

- anonymous vs. registered users
- encrypted vs. clear text content

Peer Pipe



JXTA Services

- higher-level functions
 - expand upon the capabilities of the core and facilitate application development.
- mechanisms for searching, sharing, indexing, and caching code and content to enable cross-application bridging and translation of files.
- Queries and Responses structured in XML

JXTA Applications

- built using peer services and the core layer
- P2P auctions
- Resource-sharing (SETI@home)
- Instant messaging, mail, and calendaring services
- ...

Les projets JXTA

Catégorie : Core

- `jxme` JXTA on J2ME (CDC/FP & CLDC / MIDP)
- `jxtaperl` An implementation of the core JXTA protocols in Perl 5.
- `platform` JXTA P2P platform infrastructure building blocks and protocols.
- `pocketjxta` Porting the jxta platform to the PocketPC
- `security` JXTA P2P Security Project
- `tini` pour la plate-forme embarqué TINI de iButton

Les projets JXTA

Catégorie : Core

- caservice Peer service that can validate certificate chains
- cms JXTA Content Management System
- compute-power-market Economics driven P2P Computing Platform and marketplace!
- gisp Global Information Sharing Protocol
- ipeers Artificial Intelligence in P2P networks
- jxrtl XML language allowing Active Networks to be implemented in JXTA
- jxta-grid distributed computing with varying workloads/runtimes
- **jxta-rmi RMI API on top of JXTA**
- jxta-wire Provide a set of tools to allow many to many JXTA pipes
- **jxta-xml-rpc JXTA transport binding implementation for XML-RPC**
- **jxtaspaces A Distributed Shared Memory Service for JXTA**
- jxtavfs JxtaVFS organizes JXTA network resources as virtual file system.
- monitoring Monitoring and Metering
- networkservices integrate Web Services Concepts into JXTA
- p2p-email 2P email group discussions using JXTA eergroup technology
- payment Implement anonymous and secure financial transactions
- rrs Service for local and remote administration of endeavors peers
- rvmanager RendezVous Manager
- search Distributed search service for JXTA and Web content and services

Les projets JXTA

Catégorie : Applications

- allhands Event Notification application
- brando Brando P2P Java source code sharing tool
- configurator A GUI configuration tool for the JXTA platform
- dfwbase P2P network with a database at each peer - A knowledge base
- fuel-auction Demonstration application using JXTA
- gasnet jxta-enabled GUI demo (aka fuel-auction 2)
- instantp2p JXTA Demonstration GUI
- jnushare A file-sharing application of GISP
- juxtaprose a news / discussion content sharing service
- parlor App framework for creating collaborative P2P spaces
- project2p A peer to peer solution to share project document
- rosettachat Localized JXTA Peer Text Messaging
- shell JXTA Command Line Shell for interactive access
- www A project for HTML documents and information

JXTA Shell

■ Langage de commande semblable au Shell UNIX

- Lancement de commandes en séquence ou en pipeline
- Redirection des entrées et sorties des commandes
- Lancement de commande en mode batch (batch file)

■ Commandes de base

- man, exit,
- whoami : affichage des informations concernant le peer
- peers : decouverte et listage des peers
- groups : decouverte et listage des groupes
- join/leave : joindre/quitter un groupe
- talk : instant messaging point à point
- search : recherche d'usagers
- more/cat : affichage de messages (réponse XML à un avertissement, ...)

JXTA Shell – Autres commandes

■ Partage de ressources (codat)

- share/unshare : démarre/arrête le partage d'un codat
- ls : listage des codats partagés
- search : recherche de codats sur critère

■ Communication

- inportfile/exportfile : chargement/déchargement d'un document depuis/vers le FS externe
- mkpipe : création d'un pipe (entrée ou sortie)
- send/put : envoi de messages avec document
- recv/get : réception de messages avec document

Nouvelles Commandes Shell

■ Ajout de nouvelles commandes au JXTA Shell

```
package net.jxta.impl.shell.bin.myHelloWorld
public class myHelloWorld extends net.JXTA.imp.shell.ShellApp {
    private ShellEnv myEnv;
    public int startApp (String[] args) { //args has arguments to command
        myEnv = getEnv(); // retrieve the command environment
        // extract the current peerGroup from the environment
        ShellObject obj = myEnv.get ("stdgroup");
        PeerGroup group = (PeerGroup) obj.getObject();
        if (args == null) { //println print to the console
            println("Hello my peergroup is" + group.toString());
        } else { // no arguments are authorized
            println ("Sorry no argument supported!");
        }
        return ShellApp.appNoError; // Everything went OK!
    }
    public void stopApp () { /* not much to be done here */}
}
```

Protocoles (i)

■ Peer Discovery Protocol (PDP)

- Découverte des ressources (peer groups, services, pipes, peers additionnels)
- Avertissement de ses propres ressources

■ Peer Resolver Protocol (PRP)

- Envoi de requête vers un ou plusieurs peers connus
- Réception de une ou plusieurs reponses
- Chaque requête est identifié de manière unique

■ Peer Information Protocol (PIP)

- Demande d'information sur d'autres peers (état, uptime, traffic load, capabilities, ...)

■ Peer Membership Protocol (PMP)

- Création de groupes (peer group)
- Rejoindre et Quitter un ou plusieurs groupes

■ Pipe Binding Protocol (PBP)

- Etablissement d'un pipe de communication entre 2 ou plusieurs peers

■ Peer Endpoint Protocol (PEP)

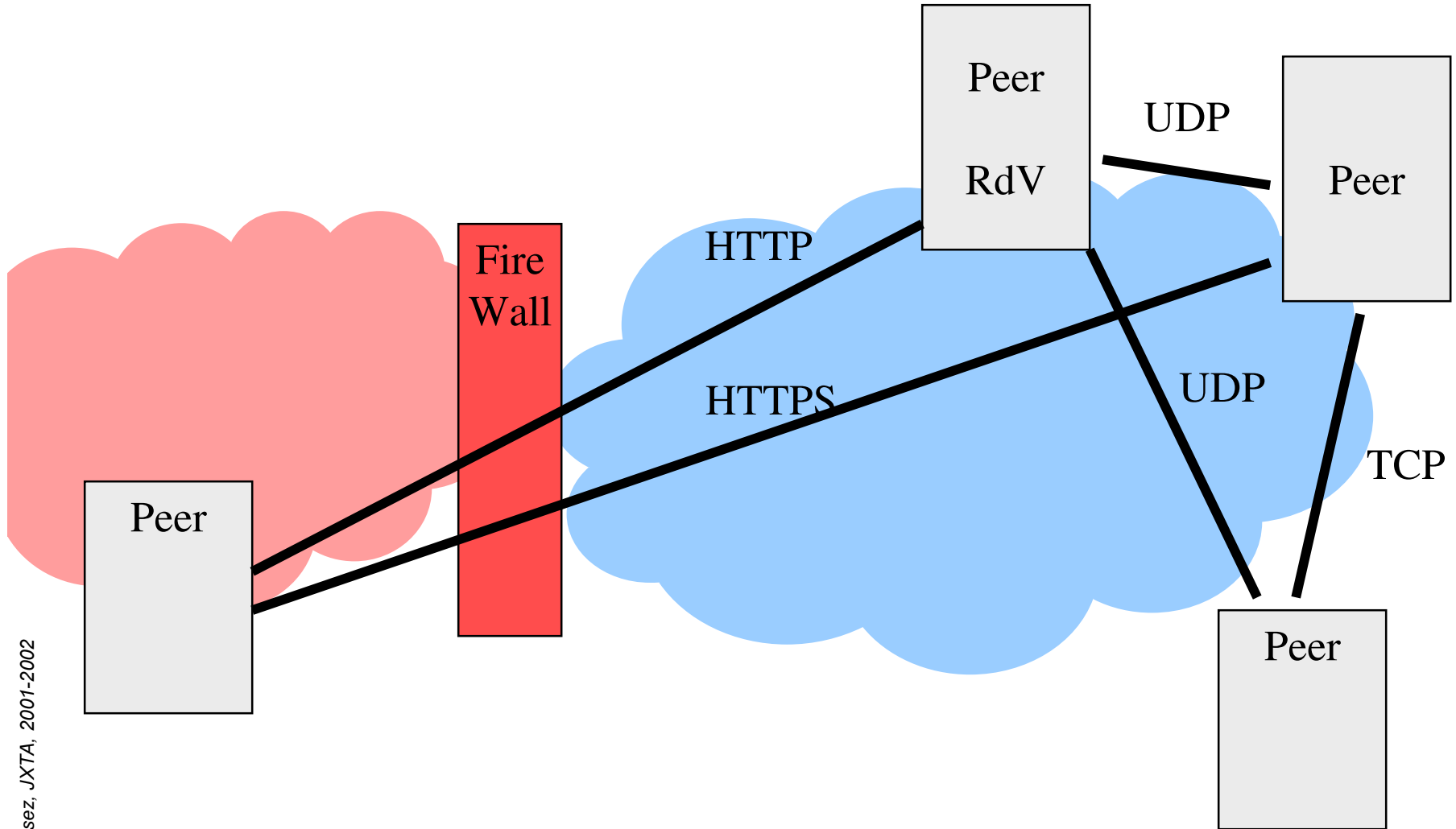
- Découverte d'un itinéraire (route=séquence de saut(hops)) vers un peer quand le peer n'est pas accessible directement

Protocoles (iii)

■ Protocoles réseaux

- TCP, UDP, UDP Multicast
- SSL/TLS
- HTTP/HTTPS en cas de firewall et pour le NAT

Infrastructure réseau



Protocoles (ii)

■ Messages

- Utilisé par les protocoles
 - Structuration XML
 - Peuvent être cachés pour optimiser les performances quand le réseau est stable (PDP)

■ Exemple

```

<?xml version="1.0" encoding="UTF-8"?>
<jxta:PeerAdvertisement>
  <Name> name of the peer</Name>
  <Keywords>search keywords </Keywords>
  <Pid> Peer Id </Pid>
  <Services>
    <jxta:ServiceAdvertisement>
      ...
    </jxta:ServiceAdvertisement>
  </Services>
  <Endpoints>
    <jxta:ServiceAdvertisement>
      ...
    </jxta:ServiceAdvertisement>
  </Endpoints>
  <InitialApp>
    <jxta:ServiceAdvertisement>
      ...
    </jxta:ServiceAdvertisement>
  </InitialApp>
</jxta:PeerAdvertisement>

```

Sécurité

■ Modèle de confiance de Poblano : Web of trusts

- Contrat social de confiance entre les pairs
- Chaque pair a une réputation partagée par plusieurs pairs

■ Virtual TLS

- TLS sur les pipes JXTA
 - Multi sauts et réversible

■ Lecture

- <http://servlet.java.sun.com/javaone/resources/content/sf2002/conf/sessions/pdfs/3075.pdf>

Comparaison

■ JXTA / JINI / Salutation

Bibliographie et Webographie

■ Project JAXP

- <http://www.jxta.org/>

■ Des livres

- Sing Li , « Early Adopter JXTA », Wrox
- Daniel Brookshier, Darren Govoni, Navaneeth Krishnan and Juan Carlos Soto , « JXTA: Java P2P Programming », SAMS, ISBN 0672323664
- Brendon J. Wilson , « JXTA », disponible sur <http://www.brendonwilson.com/projects/jxta/pdf/JXTA.pdf>.
- Joe Gradecki , « Mastering JXTA Development », Wiley Publishers, August 2002.
- Robert Flenner, Michael Abbott, Toufic Boubez, Navaneeth Krishnan, Alan Moffet, Rajam Ramamurti, Bilal Siddiqui, and Frank Sommers, «Java P2P Unleashed »,September 2002, SAMS, ISBN 0672323990.
- Scott Oaks, Bernard Traversat, and Li Gong , « JXTA in a Nutshell, A Desktop Quick Reference », O'Reilly, September 2002, ISBN 0-596-00236-X