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H O N G K O N G

FJM: A High Performance Java Message Library

Offered by Tsun-Yu Hsiao, Ming-Chun Cheng, Hsin-Ta Chiao, Shyan-Ming Yuan
Department of Computer and Information Science, National Chiao-Tung University, Taiwan, R.O.C.

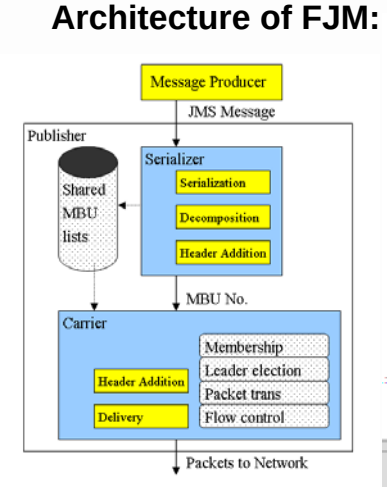
Motivations and Goals:

To build an IP-multicast-based Java Message Service (JMS) implementation. To achieve high efficiency and reliability.

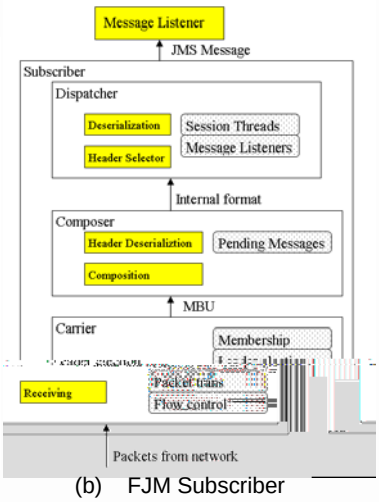
Issues:

To achieve high efficiency and reliability in a distributed design is not an easy work, because the complexity of one-to-many and NAK-based flow control scheme.

Architecture of FJM:



(a) FJM Publisher



(b) FJM Subscriber

Four major protocols:

- Membership management protocol
- Leader election protocol
- Packet transmission protocol
- NAK-based flow control protocol

Major revisions of revised FJM:

- Using direct native I/O buffer for MBU
- Reducing the creation of Java objects
- Applying new flow control scheme

The reduction formulas of the both rates are:
*Rd = Rd * Ndd and Rp = Rp / Ndp*
The rate increasing formulas of the both rates are:
*Rd = Rd * Nid and Rp = Rp * Nip*
we set the constants Ndd as 0.7, Ndp as 2, Nid as 1.2, and Nip 2.

Applications based on FJM:

- A Surface-to-Air missile training console simulator
- A high confidence e-healthcare-insurance system
- A scalable massively multiplayer virtual world

FJM download URL:

http://dcsw3.cis.nctu.edu.tw/index.php?page=download

Performance comparison with other JMS:

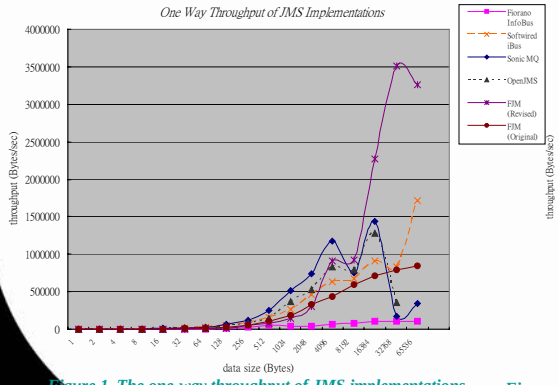


Figure 1. The one-way throughput of JMS implementations (450 MHz publisher, 450 MHz subscriber, and 450 MHz JMS server)

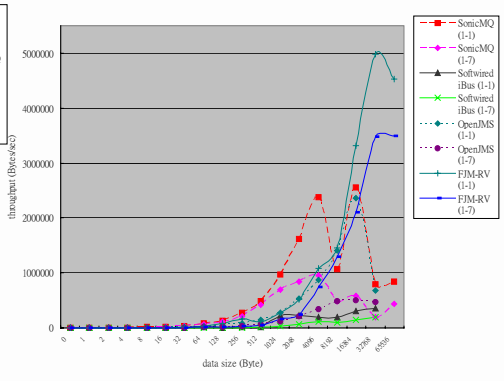


Figure 2. The throughput of JMS implementations for one-to-many communication (1.4 GHz publisher, 450 MHz subscriber, and 450 MHz JMS server)

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