CORRESPONDENCE

To the Editor:

With great interest we read the excellent paper "Implementing a Java-based image and report distribution system in a non-picture archiving and communication environment" by G. Wendt, T. Kulbago, and W. Peppler¹ published in *The Journal of Digital Imaging*. The authors of this article nicely demonstrate the advantages of Java applets for a medical image department. We have developed a similar system to distribute positron emission tomography (PET) images using new technologies, Jini and JavaSpaces, which were presented recently.²

Jini allows communication between plugged-in hardware devices and services through interfaces without installing driver or additional software on client machines and allows cooperating hardware devices, software services, and applications to access each other seamlessly, which is the basis for a truly distributed. Using Jini it is necessary to run a simple HTTP server, the remote method invocation daemon (RMID), a lookup service, and a transaction manager.

The HTTP server is used for downloading software code. The RMID applies a log file to keep track of the on demand activation and persistent service registration, so that once a service has been registered it does not have to re-register after each reboot. Instead, RMID will restart it upon start-up. The *lookup service* is used by Jini services to announce their availability and to store their proxy objects but also supplies the Jini client with a proxy object reference. This proxy object is used by the Jini client to use the registered Jini service directly. *Transaction managers* are used by Jini services to ensure that multiple operations across components or systems are either performed together as a whole or that components/systems will be starting point.

If these services are running on a single host JavaSpaces is applied to create a virtual network accessible space which can be used to store Java objects using a simple template matching mechanism.³ Our developed space application for the storage of PET data applies a template consisting of the patient data (name, acquisition date, acquisition type, emission/transmission) retrieved from the original PET data file format but also the location of the image data file. Persistent JavaSpaces log their stored objects to the disk and are able to recover the state after they are restarted, and, therefore, no stored object is lost if

the service should crash. The persistent implementation provides an object databaselike quality, which extends JavaSpaces initial appearance of being a message-oriented middleware (MOM). The user communicates with the space using an applet. Applying the new Java security model everybody, who has permission (via a policy file), selects the patient from the table and uses the stored pathname of the image file to contact a file server to retrieve the image data, which are visualized by a slice viewer written entirely in Java. The Jini API introduces a "leasing concept," which is based on the idea that the resource is loaned to clients only for a fixed period of time. If this time interval expires, the resource automatically is removed, which enables the system itself to clean up automatically if components have failed. This new concept makes it possible to define the period of time entries are stored in the space. At the moment, this time interval is 1 month, after which time the corresponding patient study is removed from the space without user intervention. If the physician wants access to a certain study for a longer period the leasing time of the corresponding patient may be increased by using the user-space communication applet.

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