CSE421 Introduction to Operating System
Fall 1999
Paper Study - Distributed Systems Technology Java's Jini

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1 Purpose

The purpose of this assignment is to study a topic of high interest in the area of Computer Systems. This study is about Java's support for distributed computing, namely, Jini. Jini is meant for connecting any device with a processor to a network to form a network-centric system as opposed to network-transparent system supported by OMG's CORBA. Jini is a realization of the notion of "network is the computer". In this study we will look into definition of Jini, its basic features, its working , system requirements, its application and its use in enterprise computing (BTW, what is enterprise computing?). This work gives you an opportunity to learn specific details about the topic which are otherwise not covered in any course in our curriculum.

2 References

1. Core Jini by Keith Edwards, Prentice Hall Inc.
2. http://pandonia.canberra.edu.au/java/jini/tutorial/Jini.xml
3. Your text book Chapters 13,14 and 15.
4. You may also search the web. If you use any material from the web, cite the URL.
5. You are encouraged to use other reference material, though it is not necessary. But make sure you appropriately cite it in your answers.

3 What to do?

1. Answer the questions given below in your handwriting and hand in the handwritten copies in class on the due date.The sheets should be stapled and your name should appear on every sheet.
2. In some cases it may be necessary to do further search.
3. **Do not copy verbatim the material given in the text. Read, understand and write the answers in your own words.**
4. Papers will be graded for what you write as answers and NOT for what you think/thought as answers.
5. Be very clear about your answers. Make sure the answers are spelling error-free and grammatically correct.
6. Do not write essays. Where ever possible try to list the ideas. Use of examples is encouraged.
7. You are required to work individually. No discussion allowed except with the TAs and me.
8. How to answer: A copy of the each question with the number followed immediately by the answer.

9. Expected size for main question is about one to two pages, long answer one-half to one full page, short answers from few sentences to a maximum of half a page. All these are approximate length for typed (not-handwritten) material. These sizes are given as guidelines.
10. Due date: 12/10/99 by midnight. No late papers will be accepted for any reason.

4 Main question

What is Jini? Clearly explain its architectural model, systems requirements to run Jini, its application areas, and its main features.

5 Long answer section

1. What is *middleware*? Explain the role of middleware in a typical client/server architecture. (Ch.13 of Stalling's text.)
2. What is a Remote Method Invocation (RMI) model of communication? Explain the basic operation of RMI. (Appendix of Jini text or Sun's RMI page)
3. Explain the five key concepts of Jini with an example each. (Ch.3 of Jini text)
4. What is a Javaspace? What role does it play in the Jini world? What are its typical application areas? Can it be put to use in the internet domain? Why or why not? (Ch.15 of Jini text)
5. Single point failure and partial failures are major problems in networked computing. How does Jini address this issue? Explain.

6 Short answer section

1. What is a transaction? What is ACID property of a transaction? Why is transaction processing given such a prominent role in Jini?
2. Explain different ways of Jini-enabling ordinary devices.
3. What is meant by a proxy? How is it used in a distributed system?
4. Explain the various methods used in the discovery process in Jini.
5. What is meant by a thin client in a general distributed system? Give an example.
6. What are thin proxy and fat proxy with reference to Jini networking? Give sample uses.
7. What is CORBA? Can Jini and CORBA coexist? Explain.
8. *Heart beat* example is often used in testing client server systems? Explain the significance of such an application.
9. Key distribution is an important function in implementing security in distributed systems. Explain the process of key distribution. (Ch 15 of Stallings)
10. Find out all the details you can about the next revolutionary concept called *residential gateway* that many companies including Sun Microsystem are working on. Provide references (URL etc.).