



Service Delivery in ad-hoc networks using Jini

Mobile ad-hoc testbed development

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Scope of Presentation

- ▶ Section 1 - Service Delivery in ad-hoc networks using Jini
 - ▶ Introduction
 - ▶ Jini Architecture
 - ▶ Implementation
 - ▶ Results
 - ▶ Conclusion
- ▶ Section 2 - Mobile ad-hoc testbed development
 - ▶ Introduction
 - ▶ Research Objectives
 - ▶ Scope of Research

Section 1: Introduction

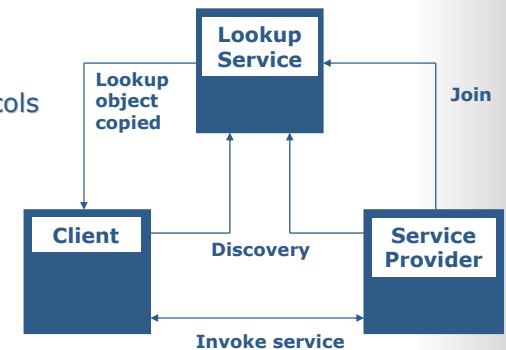


- ▶ Aim
 - ▶ Investigate the use of Jini as a possible solution to the problem of reliable service delivery
- ▶ What is Jini?
 - ▶ Jini, from Sun, enables the Ad Hoc construction of networks of components and services using Java
 - ▶ Services can be made available to any user without configuration
 - ▶ Tolerates failures and network adjustments-leasing

Jini Architecture



- ▶ 3 Principles
 - ▶ Lookup Service (LUS)
 - ▶ Discovery & Join Protocols
 - ▶ Idea of a Proxy



Implementation



- ▶ Services Developed
 - ▶ Print Service
 - ▶ File Store Service
 - ▶ Chat Service
- ▶ Implementation done using JDK 1.4 and Jini 1.2
- ▶ Test Environment

Implementation



File Store Service

- ▶ Requires Jini on both Service Provider and Client
- ▶ Allows users to view files located on another machine
- ▶ Exports service via a proxy
- ▶ Clients use copy of proxy for access

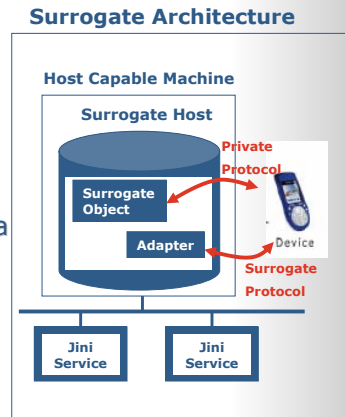


Implementation



Surrogate File Store

- ▶ Used to provide the previous service to resource constrained devices
- ▶ Uses the surrogate architecture
- ▶ Participation in Network done through a third party
- ▶ Limited device connects to Host
- ▶ Host partakes in discovery and join protocols

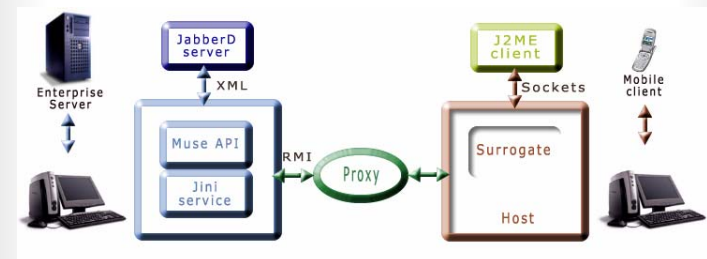


Implementation



Chat service

- ▶ Instant Messaging (IM) system using surrogate Jini
- ▶ Jabber is an open source, XML based data model
- ▶ Provides Instant Messaging and presence services

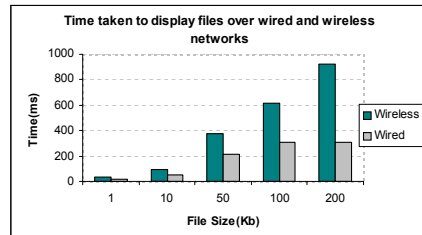


Results



File Store Performance

- ▶ 802.11b network transfers almost three times slower than the LAN for a 200 KB file
- ▶ Performance in line with bearer rates
- ▶ Limited devices - surrogate design much slower but operational and functional, low bandwidth services



Results



Chat Service Performance

- ▶ Tested using a Sony Ericsson J2ME emulator
- ▶ Connected via 802.11b and GPRS

	Jabber 802.11b	Jabber GPRS
Connect to host(s)	0.65	3.73
Receive Services(s)	3.24	4.85
Log on(s)	1.05	2.29
Send message(s)	0.34	1.50
Receive message(s)	0.36	2.62

- ▶ Performance times are reasonable

Conclusion



- ▶ Jini is a robust reliable system designed for evolving networks
- ▶ Jini supports multiple users thus allowing multiple clients to use the same service at the same time
- ▶ File Store demonstrates typical office internetworking
- ▶ IM chat provides good performance over Jini
- ▶ Jini provides ad-hoc discovery and service delivery
- ▶ Significant restrictions based on Device Capability
- ▶ Service Architecture available for low power devices

Section 2

Mobile Ad-hoc Testbed Development



Introduction

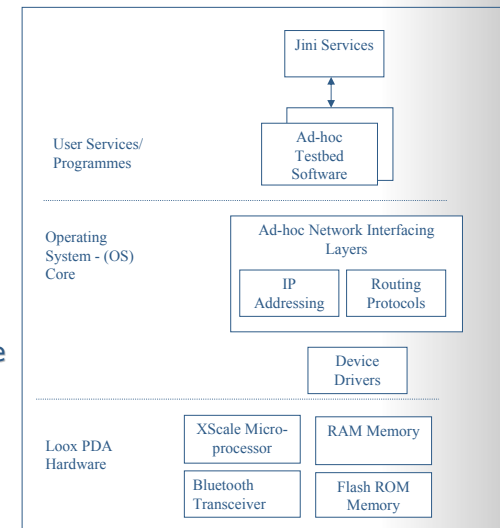


- ▶ Previous M-Zones Projects
 - ▶ IP Addressing Assignment Techniques
J.P O'Grady
 - ▶ Service discovery & delivery using Jini
Sineád Cummins
- ▶ Testbed Development
 - ▶ Implementation of developed protocols

Research Objectives



- ▶ R&D a base Operating System to execute on the LOOX PDA
- ▶ R&D abstract software network interfaces on top of the OS to implement any ad-hoc protocol
- ▶ Implement and Evaluate existing and proposed ad-hoc communication protocols



Research Scope



- ▶ Research of existing PDA OS
- ▶ Porting of Linux OS to the LOOX
 - ▶ Linux on the LOOX
 - ▶ Serial Interface
 - ▶ Setting up Development environment
- ▶ Develop Network Interface/Device Drivers
 - ▶ Bluetooth & 802.11b
- ▶ R&D existing ad-hoc protocols
- ▶ Implementation of Ad-hoc Protocols
- ▶ Testing of wireless services

