A CORBA-based Secure Session Service for Distributed Multimedia Collaborative Environments

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Introduction

• Collaborative environment (CE) allows a group of users to collaborate from their desktops as effectively as if they were face-to-face.
• Increase the need of collaborative environments with distributed multimedia applications.
Collaborative Environment Architecture

• Application
  – Distributed multimedia application
• Data Communication
  – Multimedia data
• Session Control
  – Information of collaborative environment
Data Communication vs. Session Control

- **Data Communication**
  - Multi-point Communication
  - Flow Control
  - Reliable Communication
  - Quality of Service

- **Session Control**
  - Facilities for creating, eliminating, joining, and leaving conference session
  - User authentication, data confidentiality, data integrity
Related Work (1)

- MBone
  - UNIX based
  - Virtual network
    - Data communication
    - Session control
- NetMeeting
  - Windows 95/NT based
  - Multiple point-to-point communication
  - Internet Locator Servers (ILS)
    - Centralized
Related Work (2)

- CORBA Security Service
- MBone Security
  - Encryption of data streams
  - Enhance the security of protocol format
  - The Secure Conferencing User Agent
Motivation

• Session control of CE is important.
  – But it has scarcely been researched.
  – Dedicated session control is needed.
• Session control of CE must be distributed.
  – Distributed user.
• CE must be secure and platform-independent
Goal of Research

- Distributed Session Service
- Secure Session Service
- Platform-independent
- General management of session information

Use CORBA technology
- CORBA Security Service
Secure Session Service Specification

• Session Service
  – List of session
  – Creating, eliminating, joining, and leaving conference session
  – Invitation others
  – Register of multimedia application

• Security of Session Service
  – User authentication
  – Session access control
  – Data confidentiality/ integrity
Secure Session Service Architecture

Session Management Tool & Multimedia Application

requests  replies

Log Data
Authentication
Message

SO: Service Object
SSO: Session Service Object

Remote Session Services
Session Service (1)

- Session Service Object
  - Manages generically session information
  - Session information
    - Opened sessions
    - Users currently participating in a session
    - Applications used in a session
  - Registry information
    - Information used by application.
Session Service Object
Session Service (2)

• Application Database Service Object
  – Register application.

• Domain Service Object
  – Location of distributed Session Server.
  – Centralized Server
Secure Session Service

• Domain level security
  – Domain administrator
  – Authentication, log

• Session level security
  – Session chairman
  – Session access control

• User level security
  – Message deliver
Domain Level Security

- **Authentication**
  - Authentication Service Object
  - Administration select the authentication policy
    - administration / user
  - Checking valid users

- **Log**
  - Log Service Object
  - Logging the important event related to security.
Session Level Security

- Chairman is responsible for his session.
- Session access control
  - Public session
  - Private session
    - session password
User Level Security

• Message deliver
  – Message Service Object
  – Deliver message between two users.
  – Message is eliminated after fixed time.
  – Inform sender the receiver’s response.
  – Message type
    • invitation/ session password/ reply
  – Format
    • msg type, receiver, sender, timeout, content
Implementation

• Implementation Environment
  – Solaris 2.4, 2.5
  – Orbix 2.3c & Sparc C++ 4.1
  – X-Windows, Motif Library

• Session Servers
• Session Management Tool
• Part of MAESTRO
Session Service of MAESTRO

Collaboration Application

Multimedia Service APIs

MAESTRO Services

QoS Service
Comm Service
Name Service
MDB Service
Session Service

Remote MAESTRO Services

Collaboration Application

Session Tool

MDB: Multimedia Database
Session Management Tool
Conclusion & Future Work

• A CORBA-based secure session service
  – is distributed, secure, platform-independent
  – manage generically session information
• Multimedia application of CE can easily be developed.
• Future Work
  – Integrating CORBA Security Service
  – Integrating Non-CORBA distributed multimedia applications.
  – Session service can be a new Common Object Service in the OMG standard.